

Watershed Restoration Action Strategy for the St. Joseph/Maumee Watershed

Part I: Characterization and Responsibilities



Prepared for

**Indiana Department of Environmental Management
Office of Water Quality
Watershed Management Section**

Prepared by

WITTMAN HYDRO PLANNING ASSOCIATES, INC.

320 WEST 8TH STREET, SUITE 201

BLOOMINGTON, IN 47404

PHONE: 812-333-9399

FAX: 812-333-9399

www.wittmanhydro.com

Table of Contents

Table of Contents	1
FOREWORD	4
EXECUTIVE SUMMARY	5
Overview of the St. Joseph/Maumee Watershed	5
Current Status of Water Quality in the St. Joseph/Maumee Watershed	5
Water Quality Goal	6
Part I, Chapter 1: Characterization and Responsibilities	7
1. Introduction	7
1.1 Purpose of This Document	7
1.2 Guide to the Use of This Document	7
1.3 Stakeholder Groups in the Watershed	8
Natural Resources Conservation Service	8
Soil and Water Conservation Districts	8
Hoosier River Watch	8
The Nature Conservancy - Upper St. Joseph Field Office	9
Wood-Land-Lakes Resource Conservation & Dvlpmnt	9
Allen County SWCD	9
St. Joseph River Watershed Initiative	9
DeKalb County USDA-NRCS	10
Steuben County USDA-NRCS	10
Part I, Chapter 2: General Watershed Description	11
2.1 St. Joseph/Maumee Watershed Overview	11
2.2 Land Cover, Population, and Growth Trends	12
2.2.1 General Land Cover	12
2.2.2 Population	12

St. Joseph/Maumee Watershed Restoration Action Strategy

<u>2.3 Agricultural Activities in the St. Joseph/Maumee Watershed</u>	12
<u>2.3.1 Livestock Operations</u>	12
<u>2.3.2 Crop Production</u>	13
<u>2.4 Significant Natural Areas in the St. Joseph/Maumee Watershed</u>	13
<u>State Parks, Forests, Nature Preserves, and Recreation Areas</u>	13
<u>2.5 Surface Water Use Designations and Classifications</u>	13
<u>2.5.1 Surface Water Classifications in the St. Joseph/Maumee Watershed</u>	14
<u>2.6 US Geological Survey Water Use Information for the St. Joseph/Maumee Watershed</u>	14
<u>2.7 Superfund Sites in the St. Joseph/Maumee Watershed</u>	15
<u>Part I, Chapter 3: Causes and Sources of Water Pollution</u>	16
<u>3.1 Causes of Pollution</u>	16
<u>3.1.1 E. coli Bacteria</u>	16
<u>3.1.2 Toxic Substances</u>	16
<u>3.1.3 Oxygen-Consuming Wastes</u>	18
<u>3.1.4 Nutrients</u>	19
<u>3.2 Point Sources of Pollution</u>	19
<u>3.2.1 Defining Point Sources</u>	19
<u>3.2.2 Point Source Discharges in the St. Joseph/Maumee Watershed</u>	19
<u>3.3 Nonpoint Sources of Pollution</u>	20
<u>3.3.1 Agriculture</u>	20
<u>3.3.2 Urban/Residential</u>	20
<u>3.3.3 Onsite Wastewater Disposal</u>	21
<u>3.3.4 Construction</u>	21
<u>3.3.5 Degraded Wetlands</u>	21
<u>Part I, Chapter 4: Water Quality and Use Support Ratings in the St. Joseph/Maumee Watershed</u>	22
<u>4.1 Water Quality Monitoring Programs</u>	22
<u>4.1.1 Office of Water Quality Programs</u>	22

St. Joseph/Maumee Watershed Restoration Action Strategy

<u>4.1.2 Local Volunteer Monitoring Programs</u>	23
<u>4.2 Summary of Ambient Monitoring Data for the St. Joseph/Maumee Watershed</u>	25
<u>4.3 Fish Consumption Advisories</u>	25
<u>4.4 Clean Water Act Section 305(b) Report</u>	26
<u>4.5 Clean Water Act Section 305(b) Assessment and Use-Support: Methodology</u>	26
<u>Part I, Chapter 5: State and Federal Water Programs</u>	27
<u>5.1 Indiana Department of Environmental Management Water Quality Programs</u>	27
<u>5.1.1 State and Federal Legislative Authorities for Indiana's Water Quality Program</u>	27
<u>5.1.2 Indiana's Point Source Control Program</u>	28
<u>5.1.3 Nonpoint Source Control Programs</u>	29
<u>5.1.4 Integrating Point and Nonpoint Source Pollution Control Strategies</u>	30
<u>5.1.5 Potential Sources of Funding for Water Quality Projects</u>	30
<u>5.2 Indiana Department of Natural Resources Water Programs</u>	32
<u>5.2.1 Division of Soil Conservation</u>	32
<u>5.2.2 Division of Water</u>	32
<u>5.3 USDA/Natural Resources Conservation Service Water Quality Programs</u>	33
<u>REFERENCES</u>	36
<u>Part I Tables</u>	38

FOREWORD

The St. Joseph/Maumee Watershed Restoration Action Strategy (WRAS) is intended to be a living document designed to assist restoration and protection efforts of stakeholders in their sub-watersheds. As a "living document" information contained within the WRAS will need to be revised and updated periodically.

The WRAS is divided into two parts: Part I, Characterization and Responsibilities and Part II, Concerns and Recommendations.

The first draft of the St. Joseph/Maumee WRAS was released for public review during the spring of 2002. A 60-day public comment period followed the public meetings at which this WRAS document was introduced. This final version of the WRAS includes public comments received during the 60-day comment period. For comments to be included in the final version, they were required to be written and submitted to WHPA, Inc. (the firm contracted to produce this WRAS) during the comment period.

Wittman Hydro Planning Associates, Inc.
320 West Eighth Street
Showers Plaza, Suite 201
Bloomington, IN 47404

812-333-9399

inquiry@wittmanhydro.com

EXECUTIVE SUMMARY

The overall goal and purpose of Part I of the Watershed Restoration Action Strategy (WRAS) is to provide a reference point and map to assist local citizens with improving water quality. The major water quality concerns and recommended management strategies will be addressed in Part II: Concerns and Recommendations of the WRAS.

This Strategy broadly covers the entire watershed; therefore, it is intended to be an overall strategy and does not dictate management and activities at the stream site or segment level. Water quality management decisions and activities for individual portions of the watershed are most effective and efficient when managed through sub-watershed plans. However, these sub-watershed plans must also consider the impact on the watershed as a whole.

This Strategy is intended to be a fluid document in order to respond to the changing and dynamic quality of our environment. Therefore, this Strategy will require revision when updated information becomes available. Additionally, the reader may notice that some of the information in this Strategy is provided in duplicate. This is a result of the interconnectedness of the issues discussed and an assumption made by the authors that many readers may only be interested in a few sections of this Strategy.

Overview of the St. Joseph/Maumee Watershed

One of two St. Joseph Rivers in Indiana, this river originates in Michigan and flows through Ohio before turning into northeastern Indiana. At the point where the St. Joseph converges with the St. Mary's River to form the Maumee River, the French and then the British built forts which eventually came to be called Fort Wayne after General Anthony Wayne. During the nineteenth century the St. Joseph River was a center of attraction as steamboats plied its waters and part of the river was diverted to supply water for the central section of the Wabash-Erie Canal (IDNR 1999).

The topography of the watershed varies from rolling hills in Hillsdale County, Michigan, Williams County, Ohio, and Noble and Steuben counties in Indiana, to nearly level plains in DeKalb and Allen counties. The St. Joseph River owes its existence to the glaciers which scoured the region and then spread acres of sand, gravel and boulders over the ground surface. The resulting lakes, ponds and marshes fed their waters to the St. Joseph River which emerged as a wide, slow-flowing stream. The St. Joseph River follows the Fort Wayne moraine, and flows past numerous low bluffs and terraces. This indicates that the river was once much wider and deeper. Much of the St. Joseph River bed is composed of sand and gravel deposits. The average slope of the river's bottom is 1.6 feet per mile. The character of the river corridor alternates between hardwood forest and fertile farmland. Flooding is a rare occurrence because the flow is controlled by the many natural lakes at the headwaters (SJRWI 1999).

The St. Joseph River serves as the drinking water supply for the 200,000 people of Fort Wayne. Fort Wayne's Three Rivers Filtration Plant processes 34 million gallons of water daily from the St. Joseph River. The filtration plant also operates two large reservoirs: Cedarville Reservoir, located in the St. Joseph River; and Hurshtown Reservoir. Together these reservoirs store over 1 billion gallons of water (SJRWI 1999).

Current Status of Water Quality in the St. Joseph/Maumee Watershed

Section 303(d) of the Clean Water Act requires states to identify waters that do not meet, or are not expected to meet, applicable water quality standards. The Clean Water Act Section 303(d) list for Indiana provides a basis for understanding the current status of water quality in the St. Joseph/Maumee Watershed. The waterbodies listed in Table 0-1 are on Indiana's 1998 Clean Water Act Section 303(d) list submitted to and approved by EPA (IDEM 1998). The 2002 draft 303(d) list has been completed and the final list will be released in October 2002. The draft 2002 list is not included in this document, but is available from IDEM's Office of Water Quality (<http://www.state.in.us/idem/water/planbr/wqs/303d.html>).

Water Quality Goal

The overall water quality goal for the St. Joseph/Maumee Watershed is that all waterbodies meet the applicable water quality standards for their designated uses as determined by the State of Indiana, under the provisions of the Clean Water Act.

Part I, Chapter 1: Characterization and Responsibilities

1. Introduction

The Clean Water Action Plan was developed by federal agencies in 1998 to commemorate the 25th anniversary of the Clean Water Act and to "help revitalize the nation's commitment to our valuable water resources." The Plan proposed that "states and tribes should work with public agencies and private-sector organizations and citizens to develop, based on the initial schedule for the first two years, Watershed Restoration Action Strategies, for watersheds most in need of restoration" (USEPA 1998). A WRAS is essentially a large-scale coordination plan for an eight-digit hydrologic unit watershed. Each year, more assessments and data may become available. This will require amendments to the WRAS, which must be flexible and broad enough to accommodate change. The WRAS will also foster greater cooperation among State and Federal agencies, which should result in more effective use of personnel and resources.

The WRAS provides an opportunity to assemble, in one place, projects and monitoring that have been completed or are on-going within a watershed. It also allows agencies and stakeholders to compare watershed goals and provides a guide for future work within a watershed.

The WRAS for the St. Joseph/Maumee watershed contains two parts. Part I provides a characterization of water quality in the watershed and agency responsibilities. Part II provides a discussion of resource concerns and recommended strategies.

1.1 Purpose of This Document

The overall goal and purpose of the Watershed Restoration Action Strategy Part I is to provide a reference point and roadmap to assist with improving water quality. Part I is a compilation of information, facts, and local concerns in this watershed. It will serve as a reference document for watershed groups and others involved in the assessment and planning of watershed restoration activities.

Part I of the Strategy is intended to be a fluid document in order to respond to the changing and dynamic quality of our environment. Therefore, it will require revision when updated information becomes available.

1.2 Guide to the Use of This Document

Chapter 1: Introduction - This Chapter provides a non-technical description of the purpose of Part I of the Strategy. This Chapter also provides an overview of stakeholder groups in the St. Joseph/Maumee watershed.

Chapter 2: General Watershed Description - Some of the specific topics covered in this chapter include:

- An overview of the watershed
- Hydrology of the watershed
- A summary of land use within the watershed
- Natural resources in the watershed
- Population statistics

St. Joseph/Maumee Watershed Restoration Action Strategy

- Major water uses in the watershed
- Water quality classifications and standards

Chapter 3: Causes and Sources of Water Pollution - This Chapter describes a number of important causes of water quality impacts including biochemical oxygen demand (BOD), toxic substances, nutrients, *E. coli* bacteria and others. This Chapter also describes both point and nonpoint sources of pollution.

Chapter 4: Water Quality and Use Support Ratings - This Chapter describes the various types of water quality monitoring conducted by IDEM. It summarizes water quality in the watershed based on Office of Water Quality data, and presents a summary of use support ratings for those surface waters that have been monitored or evaluated.

Chapter 5: State and Federal Water Quality Programs - Chapter 5 summarizes the existing State and Federal point and nonpoint source pollution control programs available to address water quality problems. These programs are management tools available for addressing the priority water quality concerns and issues that are discussed in Part II of the Strategy. Chapter 5 also describes the concept of Total Maximum Daily Loads (TMDLs). TMDLs represent management strategies aimed at controlling point and nonpoint source pollutants. IDEM's TMDL Strategy will also be discussed.

1.3 Stakeholder Groups in the Watershed

The St. Joseph/Maumee watershed contains several stakeholder groups that have different missions (Appendix C). Many of these groups have a long history of conservation work in the St. Joseph/Maumee watershed. The following discussions briefly describe some of the watershed groups.

Natural Resources Conservation Service

The Natural Resources Conservation Service (NRCS), under the U.S. Department of Agriculture (USDA), provides leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment. The NRCS offers landowners financial, technical, and educational assistance to implement conservation practices on privately owned land. Using this help, farmers, ranchers, and forest landowners apply practices that reduce soil erosion, improve water quality, and enhance crop land, forest land, wetlands, grazing lands, and wildlife habitat. Incentives offered by USDA promote sustainable agricultural and forestry practices, which protect and conserve valuable farm and forest land for future generations. USDA assistance also helps individuals and communities restore natural resources after floods, fires, or other natural disasters.

Soil and Water Conservation Districts

Local Soil and Water Conservation Districts (SWCD) assist land users and residents in the protection and improvement of the local environment. SWCDs can provide technical and financial assistance to local watershed conservation groups.

Hoosier River Watch

Hoosier Riverwatch is a state-sponsored water quality monitoring initiative. The program was started in 1994 to increase public awareness of water quality issues and concerns by training volunteers to monitor stream water quality. Hoosier Riverwatch collaborates with agencies and volunteers to:

- Increase public involvement in water quality issues through hands-on training of volunteers in stream monitoring and cleanup activities.
- Educate local communities about the relationship between land use and water quality.
- Provide water quality information to citizens and governmental agencies working to protect Indiana's rivers and streams.

The Nature Conservancy - Upper St. Joseph Field Office

Since 1992 The Nature Conservancy has operated a Fish Creek Project Office. The Upper St. Joseph River Project is a natural expansion of the Conservancy's work in this region. The project area includes Fish Creek and the St. Joseph River upstream from Fish Creek. Recent surveys have identified the East Fork of the West Branch of the St. Joseph River as having a mussel community with near equal quality to that of Fish Creek. The total project area of the St. Joseph River is more than 350,000 acres. Initially The Nature Conservancy will focus its efforts on Fish Creek and the East Fork of the West Branch, reducing the project area to 105,000 acres.

Wood-Land-Lakes Resource Conservation & Dvlpmnt

Wood-Land-Lakes is a six-county natural-resource-based volunteer organization in northeastern Indiana. Wood-Land-Lakes is Indiana's newest Resource Conservation and Development Area, established in 1996. RC&D is a unique process that helps people protect and develop their economic, natural, and social resources in ways that improve their area's economy, environment, and quality of life. Local RC&D Councils provide a way for people to plan and implement projects that will make their communities a better place to live. Wood-Land-Lakes accepts conservation easements, protecting farmland, woodland, pastureland, and wetlands. They have several educational programs and water quality-related projects, which include capping an abandoned landfill, participating in Hoosier RiverWatch, and promoting alternative wastewater treatment.

Allen County SWCD

Promoting the adoption of Best Management Practices (BMPs), such as no-till and other high residue conservation tillage systems, in an effort to reduce the amount of sediment, nutrient and pesticide runoff, remains a very high priority for both the Allen County and the Adams County SWCD. Their most recent effort is two-fold, the first component is conducting a research and demonstration farm, known as the Conservation Tillage Center of Excellence, partially financed by Monsanto Life Sciences Company. The second component was implementation of Phase I of a 319 project (ARN 99-222) which is providing farmers with the opportunity to conduct on-farm evaluations of new technologies and innovations in conservation tillage equipment and agronomic practices. ARN 99-222 began in August 1999 and is scheduled to be completed by January 10, 2002. To date many aspects of that project have been very successful.

The Allen County SWCD has submitted a grant proposal that would support Phase II of the Districts' effort to reduce sediment, nutrient and pesticide loading from crop production with priority given to BMPs pertaining to Core 4 objectives. The grant would expand the effort presently underway through both the existing 319 grant (ARN 99-222) and the Conservation Tillage Center of Excellence research and demonstration farm. Both of these projects showcase alternative tillage systems and related agronomic practices that incorporate conservation tillage and sound nutrient and pesticide management techniques.

The proposed 319 project would continue to provide conservation tillage equipment to farmers interested in evaluating conservation tillage systems. Additionally, Phase II would provide cost-share assistance to farmers for modification of their planting, tillage, and/or harvesting equipment to allow them to effectively implement conservation tillage and/or nutrient and pest management on their farms. The project would also continue to provide educational opportunities for farmers and others to learn more about conservation tillage and/or nutrient and pest management through field days and winter meetings.

St. Joseph River Watershed Initiative

Formed in 1996, the mission of the St. Joseph River Watershed Initiative is to develop partnerships to promote economically and environmentally compatible land uses that improve water quality in the St. Joseph River Watershed. Since the size of the St. Joseph River Watershed is so large compared to the size of the Initiative, the St. Joseph River Watershed Initiative is taking an unique way to manage its watershed. The Initiative has taken the position as coordinator and will use its resources and expertise to identify sub-watersheds. Through water sampling, the Initiative will be able to pinpoint which sub-watersheds will require corrective actions. These corrective actions will be achieved with assistance of public education, cost assistance, and state and federal conservation programs. Once the Initiative has instituted the corrective actions within the sub-watersheds, the Initiative will help develop sub-watershed groups that will carry out these actions. The Initiative would then act as a liaison to federal/state governments and mediator to the public that will involve fund raising and educational information for the public. The Initiative will continue its water-sampling within the watershed, as well as provide any technical information and support needed by the

St. Joseph/Maumee Watershed Restoration Action Strategy

sub-watershed. The Initiative developed the St. Joseph River Watershed Initiative Watershed Management Plan to provide guidance to the Initiative and its Board of Directors.

Dekalb County USDA-NRCS

The Dekalb County NRCS and SWCD have had two projects funded by 319 grants which addressed *E. coli* contamination. One project worked on developing a wetland on-site waste disposal system, and ended in 2001. The other was a demonstration project replacing failed septic systems, and is just coming to an end.

Steuben County USDA-NRCS

The Steuben County NRCS has restored or enhanced a number of wetlands in the Fish Creek Watershed in the southeast corner of the county. These projects have been financed through the Wetlands Reserve Program, the Conservation Reserve Program, and money from an oil spill nearby. The NRCS also cooperates with The Nature Conservancy to offer technical assistance to landowners.

Part I, Chapter 2: General Watershed Description

This Chapter provides a general description of the St. Joseph/Maumee Watershed and includes the following:

Section 2.1 St. Joseph/Maumee Watershed Overview

Section 2.2 Land Cover, Population, and Growth Trends

Section 2.3 Agricultural Activities in the St. Joseph/Maumee Watershed

Section 2.4 Significant Natural Areas in the St. Joseph/Maumee Watershed

Section 2.5 Surface Water Use Designations and Classifications

Section 2.6 US Geological Survey Water Use Information for the St. Joseph/Maumee Watershed

Section 2.7 Superfund Sites in the St. Joseph/Maumee Watershed

2.1 St. Joseph/Maumee Watershed Overview

The St. Joseph/Maumee watershed includes three 8 digit (04100003, 04100005, 04100007) hydrologic unit code (HUC) watersheds located in northeast Indiana, northwest Ohio, and south-central Michigan (Figure 2-1). Of the 694,400 acres in the watershed, Indiana occupies 56% of the watershed, while Michigan and Ohio each occupy 22%. The Indiana portion of the watershed encompasses approximately 1000 square miles in six different counties and approximately 780 miles of perennial streams (USEPA 2002a). It is subdivided into 63 subbasins represented on the map by 14 digit HUCs (Figure 2-2). Both Noble County and Steuben County contribute water to the St. Joseph River, through Cedar Creek and Fish Creek tributaries. Nearly 80% of the watershed is classified as agricultural and just over 12% is forested. The majority of the soils in the watershed have low to medium erosion potential (Figure 2-3).

One of two St. Joseph Rivers in Indiana, this river originates in Michigan and flows through Ohio before turning into northeastern Indiana. At the point where the St. Joseph converges with the St. Mary's River to form the Maumee River, the French and then the British built forts which eventually came to be called Fort Wayne after General Anthony Wayne. During the nineteenth century the St. Joseph River was a center of attraction as steamboats plied its waters and part of the river was diverted to supply water for the central section of the Wabash-Erie Canal (IDNR 1999).

The topography of the watershed varies from rolling hills in Hillsdale County, Michigan, Williams County, Ohio, and Noble and Steuben counties in Indiana, to nearly level plains in DeKalb and Allen counties. The St. Joseph River owes its existence to the glaciers which scoured the region and then spread acres of sand, gravel and boulders over the ground surface. The resulting lakes, ponds and marshes fed their waters to the St. Joseph River which emerged as a wide, slow-flowing stream. The St. Joseph River follows the Fort Wayne moraine, and flows past numerous low bluffs and terraces. This indicates that the river was once much wider and deeper. Much of the St. Joseph River bed is composed of sand and gravel deposits. The average slope of the river's bottom is 1.6 feet per mile. The character of the river corridor alternates between hardwood forest and fertile farmland. Flooding is a rare occurrence because the flow is controlled by the many natural lakes at the headwaters (SJRWI 1999).

The St. Joseph River serves as the drinking water supply for the 200,000 people of Fort Wayne. Fort Wayne's Three Rivers Filtration Plant processes 34 million gallons of water daily from the St. Joseph River. The filtration plant also operates two large reservoirs: Cedarville Reservoir, located in the St. Joseph River; and Hurshtown Reservoir. Together these reservoirs store over 1 billion gallons of water (SJRWI 1999).

The St. Joseph-Maumee watershed is located primarily in the Eastern Corn Belt plains ecoregion, which is characterized by rolling plains, with beech/maple vegetation, and soils that are good for cropland. The southern portion of the watershed is located

in the Huron/Erie Lake Plain ecoregion, a broad, fertile, nearly flat plain that extends into Ohio and contains highly productive farmland (US EPA 1999).

2.2 Land Cover, Population, and Growth Trends

2.2.1 General Land Cover

Native vegetation in the St. Joseph/Maumee watershed is an upland mixed hardwood forest in varied stages of succession. The U.S. Geological Survey - Biological Resources Division and the U.S. Fish and Wildlife Service are overseeing the National Gap Analysis Program (GAP). In Indiana, Indiana State University and Indiana University are carrying out the Indiana GAP Project which involves an analysis of current vegetative land cover through remote sensing (ISU 2001). This analysis provides vegetative land cover data in 30 by 30-meter grids (Figure 2-4). The following is a summary of vegetative cover in the watershed determined from the GAP image:

3.8% Urban (impervious, low and high density)
79.5% Agricultural vegetation (row crop and pasture)
12.6% Forest vegetation (shrubland, woodland, forest)
3.3% Wetland vegetation (Palustrine: forest, shrubland, herbaceous)
0.7% Open Water

2.2.2 Population

The 1990 total population in the six counties that have land portions in the watershed was 460,229 (IRBC 1998). Table 2-1 shows a break down of population by county and estimated population projections. It should be noted that these numbers do not reflect the actual population living in the St. Joseph/Maumee watershed. For example, half of Allen County is within the land area of the St. Joseph/Maumee watershed, while the majority of the city of Ft. Wayne is not included in the watershed (Figure 2-1). A better estimate of the population within the St. Joseph/Maumee watershed may be the 1995 U.S. Geological Survey Water Use Reports, which show a total population in the watershed of 215,810 in 1995 (Table 2-7).

The U.S. Census and the Indiana Business Research Center also provide information about the population in cities and towns (IBRC 1997). Table 2-2 contains population estimates for various cities and towns located within the watershed.

2.3 Agricultural Activities in the St. Joseph/Maumee Watershed

Agriculture is the dominant land use in the St. Joseph/Maumee Watershed. Section 2.2.1 shows that 79.5 percent of land cover in the watershed is agricultural vegetation. This section provides an overview of the agricultural activities in the watershed.

2.3.1 Livestock Operations

Livestock production within the watershed encompasses several species, and the overall composition changes from county to county. Hogs and cattle are produced in almost every county, Adams County produces large numbers of layers, and Noble County is a significant producer of sheep. See Table 2-3 for livestock inventory numbers. Some animals are raised in open lots or pastures and some are raised in confined feeding lots or buildings.

Confined feeding is the raising of animals for food, fur or recreation in lots, pens, ponds, sheds or buildings, where they are confined, fed and maintained for at least 45 days during any year, and where there is no ground cover or vegetation present over at least half of the animals' confinement area. Livestock markets and sale barns are generally excluded (IDEM 1999a).

Indiana law defines a confined feeding operation as any livestock operation engaged in the confined feeding of at least 300 cattle,

or 600 swine or sheep, or 30,000 fowl, such as chickens, ducks and other poultry. The IDEM regulates these confined feeding operations, as well as smaller livestock operations which have violated water pollution rules or laws, under IC 13-18-10.

As of October 1999, there were 193 livestock producers operating under the Confined Feeding Rules in the six counties of the watershed (IDEM 1999). Table 2-3 shows livestock numbers from the USDA Agricultural Census "inventory" animals in each county (USDA 1997).

2.3.2 Crop Production

The soils of the St. Joseph/Maumee watershed are good for crop production. Table 2-4 lists the acres of the major crops produced in 1997 throughout the six counties in the watershed. For 1997, total acres of soybeans for beans edged out total acres of corn for grain as the number one crop produced in the six counties. Corn and soybeans are clearly the primary crops produced in the watershed on the basis of total acres.

2.4 Significant Natural Areas in the St. Joseph/Maumee Watershed

In 1993, the Indiana Natural Resources Commission (NRC) adopted its "Outstanding Rivers" List for Indiana. This listing is referenced in the standards for utility line crossings within floodways, formerly governed by IC 14-28-2 and now controlled by 310 IAC 6-1-16 through 310 IAC 6-1-18. Except where incorporated into a statute or rule, the "Outstanding Rivers List" is intended to provide guidance rather than to have regulatory application (NRC 1997). To help identify the rivers and streams which have particular environmental or aesthetic interest, a special listing has been prepared by IDNR's Division of Outdoor Recreation. This listing is a corrected and condensed version of a list compiled by American Rivers and dated October 1990. The NRC has adopted the IDNR listing as an official recognition of the resource values of these waters. A river included in the "Outstanding Rivers List" qualifies under one or more of 22 categories. Table 2-5 presents the rivers in the St. Joseph/Maumee watershed which are on the "Outstanding Rivers List" and their significance.

State Parks, Forests, Nature Preserves, and Recreation Areas

Table 2-6 lists a number of parks, forests, nature preserves and other recreational areas within the counties included in the St. Joseph/Maumee Watershed. Since all the special areas in these counties are listed, some of the areas may be located outside of the St. Joseph/Maumee Watershed.

2.5 Surface Water Use Designations and Classifications

The following uses are designated by the Indiana Water Pollution Control Board (327 IAC 2-1-3 [327 IAC 2-1.5-5 for the Great Lakes system]):

- Surface waters of the state are designated for full-body contact recreation.
- All waters, except limited use waters, will be capable of supporting a well-balanced, warm water aquatic community and, where natural temperatures will permit, will be capable of supporting put-and-take trout fishing. All waters capable of supporting the natural reproduction of trout as of February 17, 1977, shall be so maintained.
- All waters, which are used for public or industrial water supply, must meet the standards for those uses at the point where water is withdrawn.
- All waters, which are used for agricultural purposes, must meet minimum surface water quality standards.
- All waters in which naturally poor physical characteristics (including lack of sufficient flow), naturally poor or

St. Joseph/Maumee Watershed Restoration Action Strategy

reversible man-induced conditions, which came into existence prior to January 1, 1983, and having been established by use attainability analysis, public comment period, and hearing may qualify to be classified for limited use and must be evaluated for restoration and upgrading at each triennial review of this rule.

- All waters, which provide unusual aquatic habitat, which are an integral feature of an area of exceptional natural beauty or character, or which support unique assemblages of aquatic organisms may be classified for exceptional use (or designated as outstanding state resource waters in the Great Lakes system).

All waters of the state, at all times and at all places, including the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges (327 IAC 2-1-6 [327 IAC 2-1.5-8 for the Great Lakes system]):

- that will settle to form putrescent or otherwise objectionable deposits,
- that are in amounts sufficient to be unsightly or deleterious,
- that produce color, visible oil sheen, odor, or other conditions in such degree as to create a nuisance,
- which are in amounts sufficient to be acutely toxic to, or to otherwise severely injure or kill aquatic life, other animals, plants, or humans, or
- which are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such degree as to create a nuisance, be unsightly, or otherwise impair designated uses.

2.5.1 Surface Water Classifications in the St. Joseph/Maumee Watershed

The classification of waterbodies within the Great Lakes System discussed in Section 2.5 applies to all stream segments in the St. Joseph/Maumee Watershed with the exception of the following:

Designated for limited use (327 IAC 2-1.5-19; 1997):

* Hilkey Ditch in DeKalb County from the County Line Cheese Company outfall to North County Line Road one and one-half (1.5) miles downstream,

* Hindman Ditch in DeKalb County from the Ralph Sechler Company outfall downstream to its confluence with Bear Creek.

Designated as an outstanding state resource water (327 IAC 2-1.5-19; 1997):

* Cedar Creek in Allen and DeKalb counties, from river mile 13.7 to its confluence with the St. Joseph River.

2.6 US Geological Survey Water Use Information for the St. Joseph/Maumee Watershed

The U.S. Geological Survey's (USGS) National Water-Use Information Program is responsible for compiling and disseminating the nation's water-use data. The USGS works in cooperation with local, State, and Federal environmental agencies to collect water-use information at a site-specific level. USGS also compiles the data from hundreds of thousands of sites to produce water-use information aggregated up to the county, state, and national levels. Every five years, data at the state and hydrologic region level are compiled into a national water-use data system. Table 2-7 shows the USGS Water-Use information for the St. Joseph/Maumee Watershed for 1995 (USGS 2001).

2.7 Superfund Sites in the St. Joseph/Maumee Watershed

Superfund is a program administered by the EPA to locate, investigate, and clean up the worst hazardous waste sites throughout the United States. Before the Superfund Program was established in 1980, hazardous wastes were often left in the open, where they seeped into the ground, flowed into rivers and lakes, and contaminated soil and groundwater. Consequently, where these practices were intensive or continuous, there were uncontrolled or abandoned hazardous waste sites. These sites include abandoned warehouses, manufacturing facilities, processing plants, and landfills (USEPA 2002b).

There is one Superfund (CERCLA) site listed in the St. Joseph/Maumee Watershed:

- Fort Wayne Reduction Dump - Fort Wayne, IN

The Record of Decision gives a detailed description of the site, including the media and contaminants involved. This is included in Appendix E.

Part I, Chapter 3: Causes and Sources of Water Pollution

A number of substances including nutrients, bacteria, oxygen-demanding wastes, metals, and toxic substances, cause water pollution. Sources of these pollution-causing substances are divided into two broad categories: point sources and nonpoint sources. Point sources are typically piped discharges from wastewater treatment plants, large urban and industrial stormwater systems, and other facilities. Nonpoint sources can include atmospheric deposition, groundwater inputs, and runoff from urban areas, agricultural lands and others. Chapter 3 includes the following:

Section 3.1 Causes of Pollution

Section 3.2 Point Sources of Pollution

Section 3.3 Nonpoint Sources of Pollution

3.1 Causes of Pollution

'Causes of pollution' refers to the substances which enter surface waters from point and nonpoint sources and result in water quality degradation and impairment. Major causes of water quality impairment include biochemical oxygen demand (BOD), nutrients, pesticides, toxicants (such as heavy metals, polychlorinated biphenyls [PCBs], chlorine, pH, ammonia, and cyanide), and *E. coli* bacteria. Table 3-1 provides a general overview of causes of impairment and the activities that may lead to their introduction into surface waters. Each of these causes is discussed in the following sections.

3.1.1 *E. coli* Bacteria

E. coli bacteria are associated with the intestinal tract of warm-blooded animals. They are widely used as an indicator of the potential presence of waterborne disease-causing (pathogenic) bacteria, protozoa, and viruses because they are easier and less costly to detect than the actual pathogenic organisms. The presence of waterborne disease-causing organisms can lead to outbreaks of such diseases as typhoid fever, dysentery, cholera, and cryptosporidiosis. The detection and identification of specific bacteria, viruses, and protozoa (such as *Giardia*, *Cryptosporidium*, and *Shigella*), require special sampling protocols and very sophisticated laboratory techniques which are not commonly available.

E. coli water quality standards have been established in order to ensure safe use of waters for water supplies and recreation. 327 IAC 2-1-6 Section 6(d) (327 IAC 2-1.5-8(e)(2) for Great Lakes system) states that *E. coli* bacteria, using membrane filter count (MF), shall not exceed 125 per 100 milliliters as a geometric mean based on not less than five samples equally spaced over a 30 day period nor exceed 235 per 100 milliliters in any one sample in a 30 day period.

E. coli bacteria may enter surface waters from nonpoint source runoff, but they also come from improperly treated discharges of domestic wastewater. Common potential sources of *E. coli* bacteria include leaking or failing septic systems, direct septic discharge, leaking sewer lines or pump station overflows, runoff from livestock operations, urban stormwater and wildlife. *E. coli* bacteria in treatment plant effluent are controlled through disinfection methods including chlorination (often followed by dechlorination), ozonation or ultraviolet light radiation.

There is one waterbody in the St. Joseph/Maumee watershed that appears on Indiana's 303(d) list for impairment due to *E. coli* contamination. It is currently scheduled for TMDL development from 2000 to 2004.

3.1.2 Toxic Substances

327 IAC 2-1-9(45) (327 IAC 2-1.5-2(84) for Great Lakes system) defines toxic substances as substances which are or may become harmful to plant or animal life or to food chains when present in sufficient concentrations or combinations. Toxic

St. Joseph/Maumee Watershed Restoration Action Strategy

substances include, but are not limited to, those pollutants identified as toxic under Section 307 (a)(1) of the Clean Water Act. Standards for individual toxic substances are listed in 327 IAC 2-1-6 (327 IAC 2-1.5-8 for Great Lakes system). Toxic substances frequently encountered include chlorine, ammonia, organics (hydrocarbons and pesticides), heavy metals and pH. These materials are toxic to different organisms in varying amounts, and the effects may be evident immediately or may only be manifested after long-term exposure or accumulation in living tissue.

Whole effluent toxicity testing is required for major NPDES dischargers (discharge over 1 million gallons per day or population greater than 10,000). This test shows whether the effluent from a treatment plant is toxic, but it does not identify the specific cause of toxicity. If the effluent is found to be toxic, further testing is done to determine the specific cause. This follow-up testing is called a toxicity reduction evaluation. Other testing, or monitoring, done to detect aquatic toxicity problems include fish tissue analyses, chemical water quality sampling and assessment of fish community and bottom-dwelling organisms such as aquatic insect larvae. These monitoring programs are discussed in Chapter 4.

Each of the substances below can be toxic in sufficient quantity or concentration.

Metals

Municipal and industrial dischargers and urban runoff are the main sources of metal contamination in surface water. Indiana has stream standards for many heavy metals, but the most common ones in municipal permits are cadmium, chromium, copper, nickel, lead, mercury, and zinc. These standards are listed in 327 IAC 2-1-6 (327 IAC 2-1.5-8 for Great Lakes system). Point source discharges of metals are controlled through the National Pollution Discharge Elimination System (NPDES) permit process. Mass balance models are employed to determine allowable concentrations for a permit limit. Municipalities with significant industrial users discharging wastes to their treatment facilities limit the heavy metals from these industries through a pretreatment program. Source reduction and wastewater recycling at waste water treatment plants (WWTP) also reduces the amount of metals being discharged to a stream. Nonpoint sources of metal pollution are controlled through best management practices.

In Indiana, as well as many other areas of the country, mercury contamination in fish has caused the need to post widespread fish consumption advisories. The source of the mercury is unclear; however, atmospheric sources are suspected and are currently being studied.

There are four waterbodies in the St. Joseph/Maumee watershed that appear on Indiana's 303(d) list for impairment due to mercury contamination. They are currently scheduled for TMDL development from 2010 to 2012.

Polychlorinated biphenyls (PCBs)

Polychlorinated biphenyls (PCBs) were first created in 1881 and began to be commercially manufactured around 1929. Because of their fire-resistant and insulating properties, PCBs were widely used in transformers, capacitors, and in hydraulic and heat transfer systems. In addition, PCBs were used in products such as plasticizers, rubber, ink, and wax. In 1966, PCBs were first detected in wildlife, and were soon found to be ubiquitous in the environment (Bunce 1994). PCBs entered the environment through unregulated disposal of products such as waste oils, transformers, capacitors, sealants, paints, and carbonless copy paper. In 1977, production of PCBs in North America was halted. The PCB contamination present in our surface waters and environment today is the result of historical waste disposal practices.

The Maumee, St. Joseph, and St. Mary's Rivers all appear on Indiana's 303(d) list for impairment due to PCB contamination. They are currently scheduled for TMDL development from 2010 to 2012.

Ammonia (NH₃)

Point source dischargers are one of the major sources of ammonia. In addition, discharge of untreated septic effluent, decaying organisms which may come from nonpoint source runoff and bacterial decomposition of animal waste also contribute to the level of ammonia in a waterbody. Standards for ammonia are listed in 327 IAC 2-1-6 (327 IAC 2-1.5-8 for Great Lakes system).

There is one waterbody in the St. Joseph/Maumee watershed that appears on Indiana's 303(d) list for impairment due to ammonia contamination. It is currently scheduled for TMDL development from 2000 to 2004.

Pesticides

Pesticides include a broad array of chemicals used to control plant growth (herbicides), insects (insecticides), fungi (fungicides), and other organisms. Pesticides enter surface waters primarily through nonpoint source runoff from agricultural lands and urban areas. While some pesticides undergo biological degradation by soil and water bacteria, others are very resistant to degradation. Such nonbiodegradable compounds may become "fixed" or bound to clay particles and organic matter in the soil, making them less available. However, many pesticides are not permanently fixed by the soil. Instead they collect on plant surfaces and enter the food chain, eventually accumulating in wildlife such as fish and birds. Many pesticides have been found to negatively affect both humans and wildlife by damaging the nervous, endocrine, and reproductive systems or causing cancer (Kormondy 1996).

Pesticide contamination is due not only to current nonpoint sources of pesticides, but also to legacy pesticides, or those pesticides that are no longer being used but are still persistent in the environment. Thus, measurements of pesticide pollution may not be accurate estimates of the amount of pesticides currently being discharged into surface waters, but rather reflections of both past and present pesticide use.

No portions of the St. Joseph/Maumee watershed currently appear on Indiana's 303(d) list for impairment due to pesticide contamination.

Cyanide

Cyanide is used in several manufacturing processes, including metal finishing and glass manufacturing, and consequently it may enter surface waters through industrial runoff. Cyanide ties up the hemoglobin sites that bind oxygen to red blood cells, resulting in oxygen deprivation. This condition is known as cyanosis and is characterized by a blue skin color. Cyanide also causes chronic effects on the thyroid and central nervous system (Davis & Cornwell 1998). Most water quality monitoring programs measure total cyanide. This may overestimate the threat posed by cyanide contamination however, as total cyanide is a waste product of wastewater treatment plants. The parameter of concern to human health is free cyanide, which is included in measurements of total cyanide but different methods must be used to measure it separately.

Cyanide is not a significant source of pollution in this watershed. No portions of the St. Joseph/Maumee watershed currently appear on Indiana's 303(d) list for impairment due to cyanide contamination.

3.1.3 Oxygen-Consuming Wastes

Oxygen-consuming wastes include decomposing organic matter or chemicals, which reduce dissolved oxygen in water through chemical reactions, creating what is known as biochemical oxygen demand (BOD). Raw domestic wastewater contains high concentrations of oxygen-consuming wastes that need to be removed from the wastewater before it can be discharged into a waterway. Maintaining a sufficient level of dissolved oxygen in the water is critical to most forms of aquatic life.

The concentration of dissolved oxygen in a water body is one indicator of the general health of an aquatic ecosystem. 327 IAC 2-1 Section 6(b)(3) states that concentrations of dissolved oxygen shall average at least five milligrams per liter per calendar day and shall not be less than four milligrams per liter at any time. Salmonid waters which support cold water fish have a higher dissolved oxygen requirement. In these waters, dissolved oxygen concentrations shall not be less than six milligrams per liter at any time and shall not be less than seven milligrams per liter in areas where spawning and imprinting occur during the season in which they occur. Dissolved oxygen concentrations in the open waters of Lake Michigan shall not be less than seven milligrams per liter at any time (327 IAC 2-1.5-8(d)(1)).

Dissolved oxygen concentrations are affected by a number of factors. Higher dissolved oxygen is produced by turbulent actions, such as waves, which mix air and water. Lower water temperature also generally allows for retention of higher dissolved oxygen concentrations. Low dissolved oxygen levels tend to occur more often in warmer, slow-moving waters. In general, the lowest dissolved oxygen concentrations occur during the warmest summer months and particularly during low flow periods.

Sources of dissolved oxygen depletion include wastewater treatment plant effluent, the decomposition of organic matter (such as leaves, dead plants and animals) and organic waste matter that is washed or discharged into the water. Sewage from human and household wastes is high in organic waste matter. Bacterial decomposition can rapidly deplete dissolved oxygen levels unless these wastes are adequately treated at a wastewater treatment plant. In addition, excess nutrients in a water body may lead to an

St. Joseph/Maumee Watershed Restoration Action Strategy

over-abundance of algae and reduce dissolved oxygen in the water through algal respiration and decomposition of dead algae. Also, some chemicals may react with and bind up dissolved oxygen. Industrial discharges with oxygen-consuming wasteflow may be resilient instream and continue to use oxygen for a long distance downstream.

There are two waterbodies in the St. Joseph/Maumee watershed that appear on Indiana's 303(d) list for impairment due to contamination by oxygen-consuming wastes. They are currently scheduled for TMDL development from 2000 to 2004.

3.1.4 Nutrients

The term "nutrients" in this Strategy refers to two major plant nutrients: phosphorus and nitrogen. These are common components of fertilizers, animal and human wastes, vegetation, and some industrial processes. Nutrients in surface waters come from both point and nonpoint sources. Nutrients are beneficial to aquatic life in small amounts. However, in over-abundance and under favorable conditions, they can stimulate algal blooms and excessive plant growth in quiet waters or low flow conditions. The algal blooms and excessive plant growth often reduce the dissolved oxygen content of surface waters through plant respiration and decomposition of dead algae and other plants. This is accentuated in hot weather and low flow conditions because of the reduced capacity of the water to retain dissolved oxygen.

No portions of the St. Joseph/Maumee watershed currently appear on Indiana's 303(d) list for impairment due to nutrient contamination.

3.2 Point Sources of Pollution

As discussed previously, sources of water pollution are divided into two broad categories: point sources and nonpoint sources. This section focuses on point sources. Section 3.2.1 defines point sources and Section 3.2.2 discusses point sources in the St. Joseph/Maumee Watershed.

3.2.1 Defining Point Sources

Point sources refer to discharges that enter surface waters through a pipe, ditch or other well-defined point of discharge. The term applies to wastewater and stormwater discharges from a variety of sources. Wastewater point source discharges include municipal (city and county) and industrial wastewater treatment plants and small domestic wastewater treatment systems that may serve schools, commercial offices, residential subdivisions and individual homes. Stormwater point source discharges include stormwater collection systems for medium and large municipalities which serve populations greater than 100,000 and stormwater discharges associated with industrial activity as defined in the Code of Federal Regulations (40 CFR 122.26(a)(14)). The primary pollutants associated with point source discharges are oxygen-demanding wastes, nutrients, sediment, color and toxic substances including chlorine, ammonia and metals.

Point source dischargers in Indiana must apply for and obtain a National Pollutant Discharge Elimination System (NPDES) permit from the state. Discharge permits are issued under the NPDES program, which is delegated to Indiana by the US Environmental Protection Agency (EPA). See Chapter 5 for a description of the NPDES program and permitting strategies.

3.2.2 Point Source Discharges in the St. Joseph/Maumee Watershed

As of June 1999, there were 249 active NPDES permits within the St. Joseph/Maumee watershed (Table 3-3, Figure 3-1). Of the 249 active NPDES permits, 7 are for major discharges (see Table 5-1 for a definition of a major discharge).

Another point source covered by NPDES permits is combined sewer overflows (CSO). A combined sewer system is a wastewater collection system that conveys sanitary wastewater (domestic, commercial and industrial wastewater) and stormwater through a single pipe system to a Publicly Owned Treatment Works. A CSO is the discharge from a combined sewer system at a point prior to the Publicly Owned Treatment Works. CSOs are point sources subject to NPDES permit requirements including both technology-based and water quality-based requirements of the Clean Water Act. Table 3-2 shows the CSOs in the St. Joseph/Maumee watershed.

In addition to the NPDES permitted dischargers in the watershed, there may be many unpermitted, illegal discharges to the St.

Joseph/Maumee watershed system. Illegal discharges of residential wastewater (septic tank effluent) to streams and ditches from straight pipe discharges and old inadequate systems are a problem within the watershed.

3.3 Nonpoint Sources of Pollution

Nonpoint source pollution refers to runoff that enters surface waters through stormwater runoff, contaminated ground water, snowmelt or atmospheric deposition. There are many types of land use activities that can serve as sources of nonpoint source pollution including land development, construction, mining operations, crop production, animal feeding lots, timber harvesting, failing septic systems, landfills, roads and paved areas. Stormwater from large urban areas (greater than 100,000 people) and from certain industrial and construction sites is technically considered a point source since NPDES permits are required for discharges of stormwater from these areas.

Sediment and nutrients are major pollution-causing substances associated with nonpoint source pollution. Others include *E. coli* bacteria, heavy metals, pesticides, oil and grease, and any other substance that may be washed off the ground or removed from the atmosphere and carried into surface waters. Unlike point source pollution, nonpoint pollution sources are diffuse in nature and occur at random time intervals depending on rainfall events. Below is a brief description of major areas of nonpoint sources of pollution in the St. Joseph/Maumee watershed.

3.3.1 Agriculture

There are a number of activities associated with agriculture that can serve as potential sources of water pollution. Land clearing and tilling make soils susceptible to erosion, which can then cause stream sedimentation. Pesticides and fertilizers (including synthetic fertilizers and animal wastes) can be washed from fields or improperly designed storage or disposal sites. Construction of drainage ditches on poorly drained soils enhances the movement of oxygen-consuming wastes, sediment and soluble nutrients into groundwater and surface waters.

Concentrated animal operations can be a significant source of nutrients, biochemical oxygen demand and *E. coli* bacteria if wastes are not properly managed. Impacts can result from over-application of wastes to fields, from leaking lagoons and from flows of lagoon liquids to surface waters due to improper waste lagoon management. Also there are potential concerns associated with nitrate nitrogen movement through the soil from poorly constructed lagoons and from wastes applied to the soil surface.

Grassed waterways, conservation tillage, and no-till practices are several common practices used by many farmers to minimize soil loss. Maintaining a vegetated buffer between fields and streams is another excellent way to minimize sediment and nutrient loads to streams.

3.3.2 Urban/Residential

Runoff from urbanized areas, as a rule, is more localized and can often be more severe in magnitude than agricultural runoff. Any type of land-disturbing activity such as land clearing or excavation can result in soil loss and sedimentation. The rate and volume of runoff in urban areas is much greater due both to the high concentration of impervious surface areas and to storm drainage systems that rapidly transport stormwater to nearby surface waters. This increase in volume and rate of runoff can result in streambank erosion and sedimentation in surface waters.

Urban drainage systems, including curb and guttered roadways, also allow urban pollutants to reach surface waters quickly and with little or no filtering. Pollutants include lawn care pesticides and fertilizers, automobile fluids, lawn and household wastes, road salts, and *E. coli* bacteria (from animals and failing septic systems). Household hazardous wastes have the potential to severely contaminate the water if disposed of improperly by pouring down the drain or on the ground. The diversity of these pollutants makes it very challenging to attribute water quality degradation to any one pollutant.

Replacement of natural vegetation with pavement and removal of buffers reduces the ability of the watershed to filter pollutants before they enter surface waters. The chronic introduction of these pollutants and increased flow and velocity into streams results in degraded waters. Many waters adjacent to urban areas are rated as biologically poor. This degradation also exists in lakes, which have been heavily influenced by adjacent urban development.

St. Joseph/Maumee Watershed Restoration Action Strategy

The population figures discussed in Section 2.3.2 are good indicators of where urban development and potential urban water quality impacts are likely to occur. Concentrated areas where urban development is high may lead to further water quality problems associated with the addition of impervious surfaces next to surface waters.

3.3.3 Onsite Wastewater Disposal

Septic systems contain all of the wastewater from a household or business. A complete septic system consists of a septic tank and an absorption field to receive effluent from the septic tank. The septic tank removes some wastes, but the soil absorption field provides further absorption and treatment. Septic systems can be a safe and effective method for treating wastewater if they are sized, sited, and maintained properly. However, if the tank or absorption field malfunction or are improperly placed, constructed or maintained, nearby wells and surface waters may become contaminated.

Some of the potential problems from malfunctioning septic systems include:

- Polluted groundwater: Pollutants in septic effluent include bacteria, nutrients, toxic substances, and oxygen-consuming wastes. Nearby wells can become contaminated by failing septic systems.
- Polluted surface water: Groundwater often carries the pollutants mentioned above into surface waters, where they can cause serious harm to aquatic ecosystems. Leaking septic tanks can also leak into surface waters through or over the soil. In addition, some septic tanks may directly discharge to surface waters.
- Risks to human health: Septic system malfunctions can endanger human health when they contaminate nearby wells, drinking water supplies, and fishing and swimming areas.

Pollutants associated with onsite wastewater disposal may also be discharged directly to surface waters through direct pipe connections between the septic system and surface waters (straight pipe discharge). However, 327 IAC 5-1-1.5 specifically states that "point source discharge of sewage treated or untreated, from a dwelling or its associated residential sewage disposal system, to the waters of the state is prohibited".

3.3.4 Construction

Construction activities that involve excavation, grading or filling can result in significant erosion and, consequently, sedimentation in streams, if not properly controlled. Sedimentation from developing urban areas can be a major source of pollution due to the cumulative number of acres disturbed in a watershed. Construction of single family homes in rural areas can also be a source of sedimentation when homes are placed in or near stream corridors.

As a pollution source, construction activities are typically temporary, but the impacts on water quality can be severe and long-lasting. Construction activities tend to be concentrated in the more rapidly developing areas of the watershed.

3.3.5 Degraded Wetlands

Healthy wetlands and riparian areas perform valuable water quality-related functions by filtering water and trapping sediments and pollutants. The ability of wetland and riparian areas to remove NPS pollutants from surface water runoff is determined by plant species composition, geochemistry and hydrogeomorphic characteristics. Any changes to these characteristics can affect the filtering capacities of these areas. Activities such as channelization, which modify the hydrology of floodplain wetlands, can alter the ability of these areas to retain sediment when they are flooded and result in erosion and a net export of sediment from the wetland (Reinelt and Horner 1990).

Management measures have been developed for the control of NPS pollution through the protection and restoration of wetlands and riparian areas and the use of vegetated treatment systems. Information on degraded wetlands as potential contributors to nonpoint source pollution and the management measures for NPS pollution abatement is available in the USEPA Draft Guidance entitled "National Management Measures to Protect and Restore Wetlands and Riparian Areas for the Abatement of Nonpoint Source Pollution" (USEPA 2001).

Part I, Chapter 4: Water Quality and Use Support Ratings in the St. Joseph/Maumee Watershed

This section provides a detailed overview of water quality monitoring, water quality, and use support ratings in the St. Joseph/Maumee watershed and includes the following:

Section 4.1 Water Quality Monitoring Programs

Section 4.2 Summary of Ambient Monitoring Data for the St. Joseph/Maumee Watershed

Section 4.3 Fish Consumption Advisories

Section 4.4 Clean Water Act Section 305(b) Report

Section 4.5 Clean Water Act Section 305(b) Assessment and Use-Support: Methodology

4.1 Water Quality Monitoring Programs

This section discusses water quality monitoring programs. Specifically, Section 4.1.1 describes IDEM's Office of Water Quality monitoring programs and Section 4.1.2 discusses other monitoring efforts in the watershed.

4.1.1 Office of Water Quality Programs

The Water Quality Assessment Branch of the Office of Water Quality is responsible for assessing the quality of water in Indiana's lakes, rivers and streams. This assessment is performed by field staff from the Survey Section and the Biological Studies Section. Virtually every element of IDEM's surface water quality management program of IDEM is directly or indirectly related to activities currently carried out by this Branch. The biological and surface water monitoring activities identify stream reaches, watersheds or segments where physical, chemical and/or biological quality has been or would be impaired by either point or nonpoint sources. This information is used to help allocate waste loads equitably among various sources in a way that would ensure that water quality standards are met along stream reaches in each of the nearly 100 stream segments in Indiana.

The purpose of the Surveys Section is to provide the water quality and hydrological data required for the assessment of Indiana's waters by conducting Watershed/Basin Surveys and Stream Reach Surveys. In 1996, the Section began a five-year comprehensive study (Basin Monitoring Strategy) of the State's ten major watersheds. Information from these studies is being integrated with data from biological and nonpoint source studies as well as the Fixed Station Monitoring Program to make a major assessment of the State's waters. Such surveys determine the extent to which water quality standards are being met and whether the fishable, swimmable and water supply uses are being maintained.

Information derived from this strategy will contribute significantly to improved planning processes throughout the Office of Water Quality. This plan should initiate the development of interrelated action plans, which encompass the wide range of responsibilities, such as rule-making, permitting, compliance, nonpoint source issues, and wastewater treatment facility oversight.

The Biological Studies Section conducts studies of fish and macroinvertebrate communities as well as stream habitats to establish biological conditions to which other streams may be compared in order to identify impaired streams or watersheds. The Biological Studies Section also conducts fish tissue and sediment sampling to pinpoint sources of toxic and bioconcentrating substances. Fish tissue data serve as the basis for fish consumption advisories, which are issued, through the Indiana State Department of Health, to protect the health of Indiana citizens. This Section also participates in the development of site-specific water quality standards.

St. Joseph/Maumee Watershed Restoration Action Strategy

The Biological Studies Section relies on the Volunteer Water Quality Monitoring Programs to provide additional data on lakes and wetlands that may not be sampling sites in the Monitoring Strategy. Volunteer-collected data provides IDEM scientists with an overall view of water quality trends and early warning of problems that may be occurring in a lake or wetland. If volunteers detect that a lake or wetland is severely degraded, professional IDEM scientists will conduct follow-up investigation.

4.1.2 Local Volunteer Monitoring Programs

There are numerous local volunteer monitoring programs actively working throughout the St. Joseph/Maumee watershed. Almost all of these volunteer monitoring programs are conducted through schools and county Soil and Water Conservation Districts. The individual volunteer monitoring programs in the watershed receive support and guidance from Indiana WaterWatchers, IDNR's Hoosier Riverwatch, and various other groups. The main focus of the various watershed volunteer monitoring programs is education.

The following volunteer monitoring programs are involved in conservation and/or education activities in the St. Joseph-Maumee watershed:

Group Name: Cedar Creek Wildlife Project, Inc.

Contact: Alan F. Diefenbach

Contact Address: PO Box 140, 1802 Chapman Road
Huntertown, INDIANA 46748

Contact Email: Diefenbacc@aol.com

URL: <http://home.beseen.com/community/ccwp/>

Activity: Watershed Alliance/Council

Description: Founded in 1969, the group works to preserve the Cedar Creek watershed by, in part, reducing pollution and protecting floodplain areas. It represents the public and private interests and maintains land along Cedar Creek, a designated Indiana Natural, Scenic and Recreational River.

Group Name: Indiana Lakes Management Society

Contact: Everett Lienhart

Contact Address: 22541 Lakeshore Dr.
Elkhart, INDIANA 46514

Contact Phone: 219-264-2883

URL: <http://www.nalms.org/ilms/index.htm>

Activity: Watershed Alliance/Council

Description: The purpose of the Indiana Lakes Management Society shall be to promote and encourage the understanding and comprehensive management of lakes and reservoirs and their watershed eco-systems.

Group Name: Izaak Walton League, Fort Wayne Chapter

Contact: Ron James

Contact Address: 17525 Griffin Rd.
Huntertown, Indiana 46748

Contact Phone: 219-424-7077

Contact Email: rjames@bpmjl.com

Activity: Volunteer Monitoring

Description: IWLA's Fort Wayne Chapter monitors Montana Creek watershed and portions of Cedar Creek and its watershed. We conduct reforestation and prairie restoration for recreational and educational use as well as wildlife and fisheries habitat monitoring.

Group Name: Maumee State Scenic & Recreational River

Contact: Bob Vargo, NE Asst. Regional Manager

Contact Address: ODNR, Division of Natural Areas & Preserves
Tiffin, OHIO 44883

Contact Phone: 419-981-6319

Contact Email: bobvargo@bright.net

URL: <http://www.dnr.state.oh.us/odnr/dnap>

St. Joseph/Maumee Watershed Restoration Action Strategy

Activity: Watershed Alliance/Council

Description: The Maumee River is a component of the Ohio Scenic Rivers Program with state Scenic and Recreational designation in Paulding, Defiance, Henry, Wood and Lucas counties. The program's goal is to preserve and protect the natural qualities of Ohio's finest streams for future generations.

Group Name: Maumee Whitewater Club

Contact: Richard M. Johnston

Contact Address: 9962 Diebold Road

Ft. Wayne, INDIANA 46825

Contact Phone: 219-483-5175

Activity: Watershed Alliance/Council

Group Name: The Nature Conservancy - St. Joseph River

Contact: Larry Clemens

Contact Address: 1220 N 200 W Peachtree Plz Ste G

Angola, INDIANA 46703

Contact Phone: 219-665-9141

Contact Email: tncfish@bright.net

Activity: Watershed Alliance/Council

Description: Approval for WQIP, WQ monitoring efforts at 15 pesticide sites & 14 E. coli sites, Sediment Reduction Plan completed, developing GIS capabilities on St. Joseph River, Use of Cross Slot Planter at 2 sites, 18 acre wetland reserve site, Hamilton Lake W/S Land Treatment Project, 2 sites funded with EWP funds, Funding proposal submitted, Fish Creek, WQ Monitoring, Prairie Grass Program, Cedar Crk W/S Alliance-2 stream labelled signs, Organization of "Canoe Trail" maintenance effort, and other activities.

Group Name: St. Joseph River Watershed Initiative

Contact: Bill Lambert

Contact Address: 2010 Inwood Dr Ste 103

Ft Wayne, INDIANA 46815

Contact Phone: 219-426-4637 ext.3

Contact Email: stjoseph@netusa1.net

Activity: Watershed Alliance/Council

Description: Promote landuse practices that are environmentally, economically compatible to improve water quality in the St. Joseph River Watershed.

Group Name: The Tiffin River Scenic and Historic Association

Contact: George Opdycke, Pres.

Contact Address: 18563 Williams County Road G

Bryan, OHIO 53506

Contact Phone: 419-636-9269

Activity: Watershed Alliance/Council

Description: Non-profit, local-per title

Group Name: Maumee River Basin Commission

Contact: Rodney Renkenberger

Contact Address: City-County Building Rm B-80

Ft. Wayne, INDIANA 46802

Contact Phone: 219-449-7226

Contact Email: rrenken@earthlink.net

URL: <http://www.mrbc.org>

Activity: Watershed Alliance/Council

Group Name: Loramie Valley Alliance

Contact: Greg Nageotte

Contact Address: 822 Fair Rd

Sidney, OHIO 45365

St. Joseph/Maumee Watershed Restoration Action Strategy

Contact Phone: 937-492-6520

Contact Email: greg.nageotte@oh.nrcs.usda.gov

Activity: Watershed Alliance/Council

Description: To function as a unified team providing education and implementing a plan to improve the use of natural resources in the Loramie Valley. The primary objectives are: 1. Water Management and Retention 2. Education (inform public about water quality etc.) 3. Water Quality 4. Manure Nutrient Management 5. Administration and management of projects 6. Erosion Control 7. Lake Issues and Concerns 8. Regulations

Group Name: Ottawa River Coalition

Contact: Beth Seibert

Contact Address: 3900 Campus Drive, Suite A

Lima, OHIO 45804-3596

Contact Phone: 419-223-0040

Activity: Watershed Alliance/Council

Description: Mission: To promote the wise management and use of the Ottawa River and its watershed as a valuable community resource. Activities: Water Pollution Prevention Guidebook published. 501(c)(3) status granted. 319 grant 04/95-09/98 completed. 319 Grant 04/00-03/03 started. Hydrologic Study 1999-2003 with USGS. Watershed Inventory.

Group Name: Parkway High School Environmental Science Class

Contact: Anita Morton

Contact Address: 401 S Franklin St.

Rockford, OHIO 45882

Contact Phone: 419-363-2861

Contact Email: chiquita@wptamail.com

Activity: Education Project/Program

Description: Taking a local interest in the management of our local resources.

Group Name: Putnam Soil and Water Conservation District

Contact: Bonnie Brooks

Contact Address: 215 S. Oak St.

Ottawa, Ohio 45875

Contact Phone: 419-523-5159

Contact Email: PutnamSWCD@bright.net

Activity: Volunteer Monitoring

Description: Putnam Soil and Water Conservation District is establishing a new project to acquire a base of local stream and river information.

4.2 Summary of Ambient Monitoring Data for the St. Joseph/Maumee Watershed

The fixed station-monitoring program managed by IDEM's Office of Water Quality has been monitoring surface water chemistry throughout the state since 1957. The data set from 1986 to 1995 was analyzed using the Seasonal Kendall test. This test deduces if a statistical change in the surface water chemistry occurred over a certain time period. The results of the Seasonal Kendall analysis for stations located in the St. Joseph/Maumee watershed are provided in Table 4-1. The data collected from 1991 to 1997 from this monitoring program were also analyzed to determine benchmark characteristics. The results of the benchmark characteristic analysis for stations located in the St. Joseph/Maumee watershed are provided in Appendix A. For a more in-depth discussion of this analysis, please refer to the 1997 Indiana Fixed Station Statistical Analysis (IDEM 1998b).

4.3 Fish Consumption Advisories

Since 1972, the Indiana Department of Natural Resources, the IDEM, and the Indiana State Department of Health (ISDH) have worked together to create the Indiana Fish Consumption Advisory (ISDH, IDNR, and IDEM 2001). Each year members from these three agencies meet to discuss the findings of recent fish monitoring data and to develop the new statewide fish

consumption advisory.

The 2001 advisory is based on levels of PCBs and mercury found in fish tissue. Fish are tested regularly only in areas where there is suspected contamination. In each area, samples were taken of bottom-feeding fish, top-feeding fish, and fish feeding in between. Over 1,600 fish tissue samples collected throughout the state were analyzed for PCBs, pesticides, and heavy metals. Of those samples, the majority contained at least some mercury. However, not all fish tissue samples had mercury at levels considered harmful to human health. If they did, they are listed in Table 4-3. Because of past, widespread agricultural and industrial use of these materials, their great stability and persistence in the environment, and the potential for bioaccumulation, it is not surprising that concentrations exceeding safe levels have been found in some species. Criteria for placing fish on the Indiana Fish Consumption Advisory are developed from the Great Lakes Task Force risk-based approach.

Table 4-2 shows the ISDH definitions for each Advisory Group.

Table 4-3 shows the waterbodies in the St. Joseph/Maumee Watershed that are under the 2001 fish consumption advisory.

4.4 Clean Water Act Section 305(b) Report

Section 305(b) of the Clean Water Act requires states to prepare and submit to the EPA a water quality assessment report of state water resources. A new surface water monitoring strategy for the Office of Water Quality was implemented in 1996 with the goal of monitoring all waters of the state by 2001 and reporting the assessments by 2003. Each year approximately 20 percent of the waterbodies in the state will be assessed and reported the following year. To date, one five-year monitoring cycle to survey the surface water quality of the State has been completed. The second survey cycle was begun in 2001. Appendix B contains the listing of the St. Joseph/Maumee watershed waterbodies assessed, status of designated use support, probable causes of impairment, and stream miles affected (IDEM 1998a). The methodologies of the Clean Water Act Section 305(b) assessment and use support ratings are discussed in Section 4.5.

4.5 Clean Water Act Section 305(b) Assessment and Use-Support: Methodology

The Office of Water Quality determines use support status for each stream and waterbody in accordance with the assessment guidelines provided by EPA (USEPA 1997). Results from four monitoring programs are integrated to provide an assessment for each stream and waterbody:

- Physical/chemical water column results,
- Benthic aquatic macroinvertebrate community assessments,
- Fish tissue and surficial aquatic sediment contaminant results, and
- *E. coli* monitoring results.

The assessment process was applied to each data sampling program. The individual assessments were integrated into an overall assessment for each waterbody by use designation: aquatic life support, fish consumption, and recreational use. River miles in a watershed appear as one waterbody while each lake in a watershed is reported as a separate waterbody.

Physical/chemical data for toxicants (total recoverable metals), conventional water chemistry parameters (dissolved oxygen, pH, and temperature), and bacteria (*E. coli*) were evaluated for exceedance of the Indiana Water Quality Standards (327 IAC 2-1-6). U.S. EPA 305(b) Guidelines were applied to sample results as indicated in Table 4-4 (U.S. EPA 1997).

Part I, Chapter 5: State and Federal Water Programs

This Chapter summarizes the existing point and nonpoint source pollution control programs available for addressing water quality problems in the St. Joseph/Maumee watershed. Chapter 5 includes:

Section 5.1 Indiana Department of Environmental Management Water Quality Programs

Section 5.2 Indiana Department of Natural Resources Water Programs

Section 5.3 USDA/Natural Resources Conservation Service Water Programs

5.1 Indiana Department of Environmental Management Water Quality Programs

This Section describes the water quality programs managed by the Office of Water Quality within IDEM and includes:

Section 5.1.1 State and Federal Legislative Authorities for Indiana's Water Quality Program

Section 5.1.2 Indiana's Point Source Control Program

Section 5.1.3 Indiana's Nonpoint Source Control Programs

Section 5.1.4 Integrating Point and Nonpoint Source Pollution Control Strategies

Section 5.1.5 Potential Sources of Funding for Water Quality Projects

5.1.1 State and Federal Legislative Authorities for Indiana's Water Quality Program

Authorities for some of the programs and responsibilities carried out by the Office of Water Quality are derived from a number of federal and state legislative mandates outlined below. The major federal authorities for the state's water quality program are found in sections of the Clean Water Act. State authorities are from state statutes.

Federal Authorities for Indiana's Water Quality Program:

- The Clean Water Act Section 301 - Prohibits the discharge of pollutants into surface waters unless permitted by EPA.
- The Clean Water Act Section 303(c) - States are responsible for reviewing, establishing and revising water quality standards for all surface waters.
- The Clean Water Act Section 303(d) - Each state shall identify waters within its boundaries for which the effluent limits required by 301(b)(1)(A) and (B) are not stringent enough to protect any water quality standards applicable to such waters. Requires states to develop Total Maximum Daily Loads that set the maximum amount of pollution that a water body can receive without violating water quality standards.
- The Clean Water Act Section 305(b) - Each state is required to submit a biennial report to the EPA describing the status of surface waters in that state.

St. Joseph/Maumee Watershed Restoration Action Strategy

- The Clean Water Act Section 319 - Each state is required to develop and implement a nonpoint source pollution management program.
- The Clean Water Act Section 402 - Establishes the National Pollutant Discharge Elimination System (NPDES) permitting program. Allows for delegation of permitting authority to qualifying states (which Indiana has received).
- The Clean Water Act Section 404/401 - Section 404 regulates the discharge of dredge and fill materials into navigable waters and adjoining wetlands. Section 401 requires the U.S. Army Corps of Engineers to receive a state Water Quality Certification prior to issuance a 404 permit.

State Authority for Indiana's Water Quality Program:

IC 13-13-5 Designation of Department for Purposes of Federal Law: Designates the Indiana Department of Environmental Management as the water pollution agency for Indiana for all purposes of the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) effective January 1, 1988, and the federal Safe Drinking Water Act (42 U.S.C. 300f through 300j) effective January 1, 1988. The state rulemaking authority for water is the Water Pollution Control Board. The board holds monthly meetings that are open to the public. Information on agendas, draft rules, and meeting notices can be obtained by contacting IDEM (see Appendix C).

5.1.2 Indiana's Point Source Control Program

The State of Indiana's efforts to control the direct discharge of pollutants to waters of the State were inaugurated by the passage of the Stream Pollution Control Law of 1943. The vehicle currently used to control direct discharges to waters of the State is the National Pollutant Discharge Elimination System (NPDES) permit program, authorized by the Federal Water Pollution Control Act Amendments of 1972 (also referred to as the Clean Water Act). The State of Indiana was granted primacy from U.S. EPA to issue NPDES permits on January 1, 1975 through a Memorandum of Agreement. These permits place limits on the amount of pollutants that may be discharged to waters of the State by each discharger. Limits are set at levels protective of both the aquatic life in the waters which receive the discharge and human health.

U.S. EPA, Region V, has oversight authority for Indiana's NPDES permits program. Under terms of the Memorandum of Agreement, Region V has the right to comment on all draft Major discharger permits. In addition to NPDES, the Office of Water Quality Permits Section has a pretreatment group which regulates municipalities in their development of municipal pretreatment programs and indirect discharges, or those discharges of process wastewater to municipal sewage treatment plants through Industrial Waste Pretreatment permits, and regulates Stormwater, Combined Sewer Overflow (CSO), and variance requests through a special projects group currently known as the Urban Wet Weather Group. Land Application of waste treatment plant sludge is no longer a part of the Office of Water Quality but is now a part of the Office of Land Quality (formerly Office of Solid and Hazardous Waste).

The purpose of the NPDES permit is to control the point source discharge of pollutants into the waters of the State such that the quality of the water of the State is maintained in accordance with the standards contained in 327 IAC 2. The NPDES permit requirements must ensure that the minimum amount of control is imposed upon any new or existing point source through the application of technology-based treatment requirements contained in 327 IAC 5-5-2. According to 327 IAC 5-2-2, "any discharge of pollutants into waters of the State as a point source discharge, except for exclusions made in 327 IAC 5-2-4, is prohibited unless in conformity with a valid NPDES permit obtained prior to discharge." This is the most basic principal of the NPDES permit program.

There are several different types of permits that are issued in the NPDES permitting program. Table 5-1 lists and describes the various permits. The majority of NPDES permits have existed since 1974. This means that most of the permit writing is for permit renewals. Approximately 10 percent of each year's workload is attributed to new permits, modifications and requests for estimated limits. NPDES permits are designed to be re-issued every five years but are administratively extended in full force and effect indefinitely if the permittee applies for a renewal before the current permit expires.

The federal Clean Water Act Section 104(b)(3) is the authority for NPDES-related State Program Grants. The Section 104(b)(3) program provides for developing, implementing and demonstrating new concepts or requirements that will improve the

effectiveness of the NPDES permit program. A project proposed for assistance by this program should deal predominantly with water pollution sources and activities regulated by the NPDES program and produce a strong, beneficial value for the statewide NPDES permit program. Organizations eligible for Section 104(b)(3) funding include State water pollution control agencies, interstate agencies, Tribes, colleges and universities, and other public or nonprofit organizations. For-profit entities, private associations and individuals are not eligible to receive this assistance. The Section 104(b)(3) grant program is administered by the Watershed Management Section within the Planning Branch of the IDEM Office of Water Quality.

5.1.3 Nonpoint Source Control Programs

Nonpoint source (NPS) pollution is so named because the pollutants do not originate at single point sources, such as industrial and municipal waste discharge pipes. Instead, NPS pollutants are carried over fields, lawns, and streets by rainwater, wind, or snowmelt. This runoff may carry with it such things as fertilizer, road salt, sediment, motor oil, or pesticides. These pollutants either enter lakes and streams or seep into groundwater. While some NPS pollution is naturally occurring, most of it is a result of human activities.

Reducing NPS pollution requires careful attention to land use management and local geographic and economic conditions. The state's NPS Program, administered by the IDEM Office of Water Quality's Watershed Management Section, focuses on the assessment and prevention of NPS water pollution. The program also provides for education and outreach in order to improve the way land is managed. Through the use of federal funding for the installation of best management practices (BMPs), the development of watershed management plans, and the implementation of watershed restoration pollution prevention activities, the NPS Program reaches out to citizens so that land is managed in such a way that less pollution is generated.

While a number of agencies and organizations currently have their own programs for addressing specific NPS issues, overall NPS coordination is being aided through the consolidated NPS Management Plan that was developed in the early stages of the Program's formation. The NPS Management Plan was prepared in 1989, partially based on findings from the NPS Assessment Report, which was also completed that year. The NPS Management Plan was updated and received EPA approval in 1999. Some of the objectives of the Management Plan include the education of land users and the reduction and remediation of NPS pollution caused by erosion and sedimentation of forested and agricultural lands and urban runoff. Other objectives address pesticide and fertilizer use, land application of sludge, animal waste practices, past and present mining practices, on-site sewage disposal, and atmospheric deposition.

The many nonpoint source projects funded through the Office of Water Quality are a combination of local, regional, and statewide efforts sponsored by various public and not-for-profit organizations. The emphasis of these projects has been on the local, voluntary implementation of NPS water pollution controls. Since the inception of the program in the late 1980s, it has utilized approximately \$23 million of federal funds for the development of over 299 projects.

The federal Clean Water Act contains nonpoint source provisions in several sections of the Act including the Section 319 Nonpoint Source Program, the Section 314 Clean Lakes Program (no longer funded), and the Section 205(j) Water Quality Planning Program. The Section 319 program provides for various voluntary projects throughout the state to prevent water pollution and also provides for assessment and management plans related to water bodies in Indiana impacted by NPS pollution. Section 314 has assessment provisions that assist in determining the nonpoint and point source water quality impacts on lakes and provides recommendations for improvements, but it is currently not funded by Congress. Section 205(j) provides for planning activities relating to the improvement of water quality from nonpoint and point sources by making funding available to municipal and county governments, regional planning commissions, and other public organizations. For-profit entities, non-profit organizations, private associations, and individuals are not eligible for funding through Section 205(j).

The Watershed Management Section within the Planning Branch of the Office of Water Quality provides for the administration of the Section 319 funding source for the NPS-related projects, as well as Section 205(j) grants. Clean Water Act Section 319(h) grant monies are made available to the states on an annual basis by EPA. Agencies and organizations in the state that deal with NPS problems submit proposals to the Office of Water Quality each year for use of these funds in various projects.

One of the most important aspects of all NPS pollution prevention programs is the emphasis on the watershed approach to these programs. This calls for users in the watershed to become involved in the planning and implementation of practices which are designed to prevent pollution. By looking at the watershed as a whole, all situations causing the degradation of water quality will be addressed, not just a few. Appendix C lists the conservation partners and local stakeholders located in the St. Joseph/Maumee watershed.

5.1.4 Integrating Point and Nonpoint Source Pollution Control Strategies

Two key long-term objectives of watershed management are integrating point and nonpoint source pollution controls and determining the amount and location of the remaining assimilative capacity in a watershed. The information is used for a number of purposes, including: determining if and where new or expanded municipal or industrial wastewater treatment facilities can be allowed; setting the recommended treatment level at these facilities; and identifying where point and nonpoint source pollution controls must be implemented to restore capacity and maintain water quality standards.

Total Maximum Daily Loads

The Clean Water Act mandates an integrated point and nonpoint source pollution control approach. This approach, called a total maximum daily load (TMDL), uses the concept of determining the total pollutant loading from point and nonpoint sources that a waterbody can assimilate while still maintaining its designated use (maintaining water quality standards). The U.S. EPA is responsible for ensuring that TMDLs are completed by States and for approving the completed TMDLs.

Under the TMDL approach, waterbodies that do not meet water quality standards are identified. States establish priorities for action, and then determine reductions in pollutant loads or other actions needed to meet water quality goals. The approach is flexible and promotes a watershed approach driven by local needs and directed by the State's list of priority waterbodies. The overall goal in developing the TMDL is to establish the management actions on point and nonpoint sources of pollution necessary for a waterbody to meet water quality standards.

The IDEM Office of Water Quality has reorganized its work activities around a five-year rotating basin schedule. The waters of the state have been grouped geographically into major river basins, and water quality data and other information will be collected and analyzed from each basin, or group of basins, once every five years. The schedule for implementing the TMDL Strategy is proposed to follow this rotating basin plan to the extent possible. Supplemental data collection (i.e. collection during a year other than the one prescribed in the Surface Water Quality Monitoring Strategy) may also be required to complete the TMDL process. The TMDL Strategy discusses activities to be accomplished in three phases. Phase One involves planning, sampling and data collection and will take place the first year. Phase Two involves TMDL development and will occur in the second year, and Phase Three is the TMDL implementation and will occur the third year. It is expected that some phases, especially implementation of TMDLs (Phase Three) in the basin(s), may take more than one year to fully accomplish.

In Phase Three, the TMDL scenario chosen in conjunction with watershed stakeholders during Phase Two will be used to develop a plan to implement the TMDL. During this process, stakeholder participation will be essential. The Basin Coordinator, in conjunction with the stakeholder groups, will develop a plan to implement the TMDL. Once the draft plan has been finalized through comments from stakeholder groups and IDEM, the plan becomes 'draft-final' and open to public review. Public meetings will be held in affected areas to solicit comments.

5.1.5 Potential Sources of Funding for Water Quality Projects

There are numerous sources of funding for all types of water quality projects. The sources of funding include federal and state agencies, nonprofits, and private funding. Funds may be loans, cost share projects, or grants. Section 319(h) grants and other funding sources are discussed below.

If a local government, environmental group, university researcher, or other individual or agency wants to find funding to address a local water quality problem, it is well worth the time to prepare a thorough but concise proposal and submit it to applicable funding agencies. Even if a project is not funded, follow-up should be done to determine what changes may be needed in order to make the application more competitive.

Section 319(h) Grants

EPA offers Clean Water Act Section 319(h) grant moneys to the state on an annual basis. These grants must be used to fund projects that address nonpoint source pollution issues. Some projects which the Office of Water Quality has funded with this money in the past include best management practice (BMP) demonstrations, watershed water quality improvements, data management, educational programs, modeling, stream restoration, and riparian buffer establishment. Projects are usually two to

St. Joseph/Maumee Watershed Restoration Action Strategy

three years in length. Section 319(h) grants are intended to be used for project start-up, not as a continuous funding source. Units of government, nonprofit groups, and universities in the state that have expertise in nonpoint source pollution problems are invited to submit Section 319(h) proposals to the Office of Water Quality

Office of Water Quality staff review proposals for minimum 319(h) eligibility criteria such as:

- Does it support the state NPS Management Program objectives?
- Does the project address targeted, high priority watersheds?
- Are there sufficient non-federal cost-share matching funds available (25% of project costs, either cash or in-kind services)?
- Are measurable outputs identified?
- Is monitoring required? Is there a Quality Assurance/Quality Control plan for monitoring?
- If a Geographical Information System/Global Positioning System is used, is it compatible with that of the state?
- Is there a commitment for educational activities and a final report?
- Are upstream sources of NPS pollution addressed?
- Are local stakeholders involved in the project?

Office of Water Quality staff separately review and rank each proposal which meets the minimum 319(h) eligibility criteria. In their review, members consider such factors as: technical soundness; likelihood of achieving water quality results; degree of balance lent to the statewide NPS Program in terms of project type; and competence/reliability of contracting agency. They then convene to discuss individual project merits, to pool all rankings and to arrive at final rankings for the projects. Comments are also sought from outside experts in other governmental agencies, nonprofit groups, and universities. The Office of Water Quality seeks a balance between geographic regions of the state and types of projects. All proposals that rank above the funding target are included in the annual grant application to EPA, with EPA reserving the right to make final changes to the list. Actual funding depends on approval from EPA and yearly congressional appropriations.

To obtain more information about applying for a Section 319(h) grant, contact:

IDEM Office of Water Quality
Watershed Management Section
100 N. Senate Avenue
P.O. Box 6015
Indianapolis, IN 46206-6015
(317) 233-8803

Other Sources of Funding

Besides Section 319(h) funding, there are numerous sources of funding for all types of water quality projects. The sources of funding include federal and state agencies, nonprofit, and private funding. Funds may be loans, cost shares, or grants. Appendix D provides a summary list of agencies and funding opportunities.

5.2 Indiana Department of Natural Resources Water Programs

5.2.1 Division of Soil Conservation

The Division of Soil Conservation's mission is to ensure the protection, wise use, and enhancement of Indiana's soil and water resources. The Division's employees are part of Indiana's Conservation Partnership, which includes the 92 soil and water conservation districts (SWCDs), the USDA Natural Resources Conservation Service, and the Purdue University Cooperative Extension Service. Working together, the partnership provides technical, educational, and financial assistance to citizens to solve erosion and sediment-related problems occurring on the land or impacting public waters.

The Division administers the Clean Water Indiana soil conservation and water quality protection program under guidelines established by the State Soil Conservation Board, primarily through the local SWCDs in direct service to landusers. The Division staff includes field-based resource specialists who work closely with landusers, assisting in the selection, design, and installation of practices to reduce soil erosion on agricultural land. The Stormwater and Sediment Control Program works primarily with developers, contractors, realtors, property holders and others to address erosion and sediment concerns on non-agricultural lands, especially those undergoing development.

The Lake and River Enhancement (LARE) program utilizes a watershed approach to reduce non-point source sediment and nutrient pollution of Indiana's and adjacent states' surface waters to a level that meets or surpasses state water quality standards. To accomplish this goal, LARE provides technical and financial assistance to local entities for qualifying projects that improve and maintain water quality in public access lakes, rivers, and streams.

Hoosier Riverwatch is a water quality monitoring initiative which aims to increase public awareness of water quality issues and concerns through hands-on training of volunteers in stream monitoring and cleanup activities. Hoosier Riverwatch collaborates with agencies and volunteers to educate local communities about the relationship between land use and water quality and to provide water quality information to citizens and governmental agencies working to protect Indiana's rivers and streams.

5.2.2 Division of Water

The IDNR Division of Water (DOW) is charged by the State of Indiana to maintain, regulate, collect data on, and evaluate Indiana's surface and ground water resources.

The Engineering Branch of the DOW includes Dam and Levee Safety, Project Development, Surveying, Drafting, and Computer Services. The Dam and Levee Safety Section performs geotechnical and hydraulic evaluation on existing and proposed dams and levees throughout the State. The Project Development Section provides technical support to locally funded water resource projects along with engineering leadership and construction management to State-funded water resource projects. The remaining sections provide support services to all Sections within the DOW such as reservoir depth mapping, topographic mapping, highwater marks, design of publications and brochures, and computer procurement and maintenance.

The Planning Branch of the DOW consists of Basin Studies, Coastal Coordination, Floodplain Management, Ground Water, Hydrology and Hydraulics, and Water Rights. Basin Studies are comprehensive reports on surface- and ground-water availability and use. Coastal Coordination is a communication vehicle to address Lake Michigan's diverse shoreline issues. Floodplain Management involves various floodplain management aspects including coordination with the National Flood Insurance Program and with State and Federal Emergency Management agencies during major flooding events. The Ground Water Section maintains the water-well record computer database and publishes reports and maps on the groundwater resource for the State. The Hydrology and Hydraulics Section develops and reviews floodplain mapping and performs hydrologic studies and modeling. The Water Rights Section investigates and mediates groundwater/surface water rights issues, licenses water-well drillers, and develops well construction and abandonment procedures.

The Regulations Branch of DOW is made up of Stream Permits, Lake Permits, Permit Administration, Public Assistance, and Legal Counsel. The Stream Permits Section is responsible for reviewing permit applications for construction activity in the 100 year regulatory floodway along Indiana's waterways. The Lake Permits Section reviews construction projects at or below the

legal lake level for all of Indiana's public freshwater lakes. Permit Administration Section provides administrative support to Branch staff, maintains the application database, and coordinates the application review process with other Divisions. The Public Assistance Section provides technical assistance on possible permit applications on proposed construction projects, investigates and mediates unpermitted construction activities and in some cases, with the support of Legal Counsel, pursues legal action for violation of State laws.

5.3 USDA/Natural Resources Conservation Service Water Quality Programs

While there are a variety of USDA programs available to assist people with their conservation needs, the following assistance programs are the principal programs available.

Conservation of Private Grazing Land Initiative (CPGL)

The Conservation of Private Grazing Land initiative will ensure that technical, educational, and related assistance is provided to those who own private grazing lands. It is not a cost-share program. This technical assistance will offer opportunities for: better grazing land management; protecting soil from erosive wind and water; using more energy efficient ways to produce food and fiber; conserving water; providing habitat for wildlife; sustaining forage and grazing plants; using plants to sequester greenhouse gases and increase soil organic matter; and using grazing lands as a source of biomass energy and raw materials for industrial products.

Conservation Reserve Program (CRP)

NRCS provides technical assistance to landowners interested in participating in the Conservation Reserve Program administered by the USDA Farm Service Agency. The Conservation Reserve Program reduces soil erosion, protects the Nation's ability to produce food and fiber, reduces sedimentation in streams and lakes, improves water quality, establishes wildlife habitat, and enhances forest and wetland resources. It encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife plantings, trees, filterstrips, or riparian buffers. Farmers receive an annual rental payment for the term of the multi-year contract. Cost-share funding is provided to establish the vegetative cover practices.

Conservation Technical Assistance (CTA)

The purpose of the CTA program is to assist landusers, communities, units of state and local government, and other Federal agencies in planning and implementing conservation systems. The purpose of the conservation systems is to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands.

One objective of the program is to assist individual landusers, communities, conservation districts, and other units of State and local government and Federal agencies to meet their goals for resource stewardship and assist individuals in complying with State and local requirements. NRCS assistance to individuals is provided through conservation districts in accordance with the Memorandum of Understanding signed by the Secretary of Agriculture, the Governor of the State, and the conservation district. Assistance is provided to landusers voluntarily applying conservation practices and to those who must comply with local or State laws and regulations.

Another objective is to provide assistance to agricultural producers to comply with the highly erodible land (HEL) and wetland (Swampbuster) provisions of the 1985 Food Security Act as amended by the Food, Agriculture, Conservation and Trade Act of 1990 (16 U.S.C. 3801 et. seq.), the Federal Agriculture Improvement and Reform Act of 1996, and wetlands requirements of Section 404 of the Clean Water Act. NRCS makes HEL and wetland determinations and helps landusers develop and implement conservation plans to comply with the law. The program also provides technical assistance to participants in USDA cost-share and conservation incentive programs.

NRCS collects, analyzes, interprets, displays, and disseminates information about the condition and trends of the Nation's soil

St. Joseph/Maumee Watershed Restoration Action Strategy

and other natural resources so that people can make good decisions about resource use and about public policies for resource conservation. They also develop effective science-based technologies for natural resource assessment, management, and conservation.

Environmental Quality Incentives Program (EQIP)

The Environmental Quality Incentives Program provides technical, educational, and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands in an environmentally beneficial and cost-effective manner. The program provides assistance to farmers and ranchers in complying with Federal, State, and tribal environmental laws, and encourages environmental enhancement. The program is funded through the Commodity Credit Corporation. The purposes of the program are achieved through the implementation of a conservation plan, which includes structural, vegetative, and land management practices on eligible land. Five to ten year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management.

Fifty percent of the funding available for the program is targeted at natural resource concerns relating to livestock production. The program is carried out primarily in priority areas that may be watersheds, regions, or multi-state areas, and for significant statewide natural resource concerns that are outside of geographic priority areas.

Small Watershed Program and Flood Prevention Program (WF 08 or FP 03)

The Small Watershed Program works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance are available.

Watershed Surveys and Planning

The Watershed and Flood Prevention Act, P.L. 83-566, August 4, 1954, (16 U.S.C. 1001-1008) authorized this program. Prior to fiscal year 1996, small watershed planning activities and the cooperative river basin surveys and investigations authorized by Section 6 of the Act were operated as separate programs. The 1996 appropriations act combined the activities into a single program entitled the Watershed Surveys and Planning program. Activities under both programs are continuing under this authority.

The purpose of the program is to assist Federal, State, and local agencies and tribal governments to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries.

Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and floodplain management assistance. The focus of these plans is to identify solutions that use land treatment and non-structural measures to solve resource problems.

Wetlands Reserve Program (WRP)

The Wetlands Reserve Program is a voluntary program to restore wetlands. Participating landowners can establish conservation easements of either permanent or 30 year duration, or can enter into restoration cost-share agreements where no easement is involved. In exchange for establishing a permanent easement, the landowner receives payment up to the agricultural value of the land and 100 percent of the restoration costs for restoring the wetlands. The 30 year easement payment is 75 percent of what would be provided for a permanent easement on the same site and 75 percent of the restoration cost. The voluntary agreements are for a minimum 10 year duration and provide for 75 percent of the cost of restoring the involved wetlands. Easements and restoration cost-share agreements establish wetland protection and restoration as the primary land use for the duration of the

easement or agreement. In all instances, landowners continue to control access to their land.

Wildlife Habitat Incentives Program (WHIP)

The Wildlife Habitat Incentives Program provides financial incentives to develop habitat for fish and wildlife on private lands. Participants agree to implement a wildlife habitat development plan and USDA agrees to provide cost-share assistance for the initial implementation of wildlife habitat development practices. USDA and program participants enter into a cost-share agreement for wildlife habitat development. This agreement generally lasts a minimum of 10 years from the date that the contract is signed.

REFERENCES

- Bunce, Nigel J. 1994. *Environmental Chemistry*. Second Edition. Wuerz Publishing Ltd., Winnipeg, Canada.
- Davis, Mackenzie L. and David A. Cornwell. 1998. *Introduction to Environmental Engineering*. Third Edition. WCB/McGraw-Hill, Boston, MA.
- Indiana Business Research Center (IBRC). 1999. *Indiana County Population Projections 1990-2020*. http://www.stats.indiana.edu/web/county/projections/99county_projections.html
- IBRC. 1997. *Indiana Cities and Towns Population*. <http://www.stats.indiana.edu/web/city/citytwne99.html>
- Indiana Community Action Association (ICAA). 2000. *Combined Sewer Overflows*. <http://www.incap.org/RCAPprojects.htm>
- Indiana Department of Environmental Management (IDEM). 2001. *NPDES Permit Compliance System Facility, Outfall and Discharge Data*. Office of Water Quality. <http://www.state.in.us/idem/owm/fasb/NPDESfacilitiesmap.html>
- IDEM. 1999a. *Confined Feeding Operations*. As presented on <http://www.stat.in.us/idem/oshwm/confined.html>
- IDEM. 1999b. *Watershed Action Guide for Indiana*. Office of Water Quality, Watershed Management Section. http://www.in.gov/idem/water/planbr/wsm/watershed_action.html
- IDEM. 1998. *Indiana's 1998 303(d) List of Impaired Waterbodies*. Office of Water Quality. <http://www.IN.gov/idem/water/planbr/wqs/303d.html>
- IDEM. 1998a. *Indiana 305(b) Report in Indiana Water Quality Report 1998*. Office of Water Quality, Water Quality Standards Section. <http://www.IN.gov/idem/water/planbr/wqs/quality.html>
- IDEM. 1998b. *Indiana Fixed Station Statistical Analysis 1997*. Office of Water Quality, Assessment Branch. IDEM 32/02/005/1998
- Indiana Department of Natural Resources (IDNR). 1999. *The Indiana Canoeing Guide*. Indiana Department of Natural Resources, Indianapolis, IN. <http://www.state.in.us/dnr/outdoor/canoegui/index.htm>
- IDNR. 1980. *The Indiana Water Resource*. Indiana Department of Natural Resources, Indianapolis, IN.
- Indiana State Department of Health (ISDH), IDNR, and IDEM. 2001. *Indiana Fish Consumption Advisory*. Indiana State Department of Health, Indiana Department of Natural Resources, and Indiana Department of Environmental Management. http://www.in.gov/isdh/dataandstats/fish/fish_2001/fish_cvr_2001.htm
- Indiana State University (ISU). 2001. *Indiana GAP Analysis*. <http://baby.indstate.edu/geo/rs/overgap.htm>
- Indiana Water Pollution Control Board. 1997. 327 IAC 2-1.5-19 Limited use waters and outstanding state resource waters. <http://www.in.gov/legislative/iac/title327.html>
- Kormondy, Edward J. 1996. *Concepts of Ecology*. Fourth Edition. Prentice Hall, Upper Saddle River, New Jersey.
- Natural Resources Commission (NRC). 1997. *Outstanding Rivers List for Indiana*. As presented on <http://www.ai.org/nrc/policy/outstand.htm> Last update: October.
- Natural Resources Conservation Service (NRCS) and Indiana Department of Environmental Management (IDEM). 2000. *Unified Watershed Assessment, 2000-2001*. NRCS, IDEM, and the Indiana W.A.T.E.R. Committee (Watershed Agency Team for Enhancing Resources). <http://www.in.gov/idem/water/planbr/wsm/WatershedManagementInformation.html>

St. Joseph/Maumee Watershed Restoration Action Strategy

Reinelt, L.E. and R.R. Horner. 1990. *Characterization of the Hydrology and Water Quality of Palustrine Wetlands Affected by Urban Stormwater*. Puget Sound Wetlands and Stormwater Management Research Program. King County Department of Natural Resources, King County, WA.

St. Joseph River Watershed Initiative. 1999. *St. Joseph River Watershed Initiative Watershed Management Plan*. <http://www.sjrwi.org/images/other/wmp.pdf>

U.S. Department of Agriculture (USDA). 1997. *1997 Census of Agriculture Profiles: Indiana State and County Profiles, Ranked Items and Other County Summary Data*. <http://www.nass.usda.gov/census/census97/profiles/in/inb.htm>

U.S. Environmental Protection Agency (USEPA). 2002a. *Surf Your Watershed*. http://cfpub.epa.gov/surf/locate/hucperstate_search.cfm?statepostal=IN

USEPA. 2002b. *Envirofacts Warehouse: Hazardous Waste*. <http://www.epa.gov/enviro/html/hazard.html#Superfund>

USEPA. 2001. *National Management Measures to Protect and Restore Wetlands and Riparian Areas for the Abatement of Nonpoint Source Pollution*. Washington, DC: U.S. Environmental Protection Agency. EPA 841-B-01-001.

USEPA. 1999. *Level III Ecoregions of Indiana*. Washington, DC: U.S. Environmental Protection Agency, National Health and Environmental Effects Research Laboratory. Revised March 1999. <http://www.hort.purdue.edu/newcrop/cropmap/indiana/maps/INeco3.html>

USEPA. 1998. *Clean Water Action Plan: Restoring and Protecting America's Waters*. Washington, DC: U.S. Environmental Protection Agency, Office of Water, Office of Wetlands, Oceans, and Watersheds. EPA 840-R-98-001. <http://www.cleanwater.gov/action/toc.html>

USEPA. 1997. *Guidelines for Preparation of the State Water Quality Assessments (305[b] Reports) and Electronic Updates: Report Contents*. Washington, DC: U.S. Environmental Protection Agency. EPA-841-B-97-002A.

U.S. Geological Survey (USGS). 2001. *Indiana Water Use Reports - 1995*. <http://water.usgs.gov/watuse/spread95.html>

USGS and EPA. Undated. *Ecoregions Map of Indiana and Ohio*. USGS, P.O. Box 25286, Denver, Colorado 80225. ISBN 0-607-90528-x.

Part I Tables

TABLE 0-1: WATERS OF THE ST. JOSEPH-MAUMEE ON INDIANA'S 1998 303(D) LIST

ID	Waterbody	Parameter of Concern	Priority for TMDL development
IN-0041ECOLI-1998	CEDAR CREEK	E. COLI	2000-2004
IN-0042AMMON-1998	GARRETT CITY DITCH	AMMONIA	2000-2004
IN-0044FCMRC-1998	HAMILTON LAKE	FCA - MERCURY	2010-2012
IN-0046FCMRC-1998	ST. JOSEPH RIVER	FCA - MERCURY	2010-2012
IN-0046FCPCB-1998	ST. JOSEPH RIVER	FCA - PCBS	2010-2012
IN-0048DISOX-1998	SWARTZ-CARNAHAN DITCH	DISSOLVED OXYGEN	2000-2004
IN-0049DISOX-1998	TIERNAN DITCH	DISSOLVED OXYGEN	2000-2004
OH65 21-1998	ST. JOSEPH RIVER (FISH CREEK TO OH/INDIANA BORDER)	METALS SILTATION HABITAT ALTERATIONS	9
OH65 26-1998	FISH CREEK (OH/INDIANA BORDER TO ST. JOSEPH RIVER)	PRIORITY ORGANICS SILTATION	12
OH65 28-1998	ST. JOSEPH RIVER (BEAR CREEK TO FISH CREEK)	HABITAT ALTERATIONS	9
OH65 31-1998	BEAR CREEK	HABITAT ALTERATIONS	7
OH65 33-1998	ST. JOSEPH RIVER (NETTLE CREEK TO	HABITAT ALTERATIONS	7

St. Joseph/Maumee Watershed Restoration Action Strategy

ID	Waterbody	Parameter of Concern	Priority for TMDL development
	BEAR CREEK)		
OH65 36-402-1998	NETTLE LAKE	OTHER INORGANICS NUTRIENTS ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN HABITAT ALTERATIONS PATHOGENS SUSPENDED SOLIDS	7
OH65 37-1998	ST. JOSEPH RIVER (EAST/WEST BRANCH TO NETTLE CR.)	HABITAT ALTERATIONS	7
OH65 38-399-1998	LAKE LA SU AN	PESTICIDES AMMONIA NUTRIENTS ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN TURBIDITY	7
OH65 39-1998	WEST BRANCH ST. JOSEPH RIVER		12
IN-0045FCMRC-1998	MAUMEE RIVER	FCA - MERCURY	2010-2012
IN-0045FCPCB-1998	MAUMEE RIVER	FCA - PCBS	2010-2012
IN-0046FCMRC-1998	ST. JOSEPH RIVER	FCA - MERCURY	2010-2012
IN-0046FCPCB-1998	ST. JOSEPH RIVER	FCA - PCBS	2010-2012
IN-0047FCMRC-1998	ST. MARY'S RIVER	FCA - MERCURY	2010-2012
IN-0047FCPCB-1998	ST. MARY'S RIVER	FCA - PCBS	2010-2012
OH65 1-1998	MAUMEE RIVER (GORDON CREEK TO TIFFIN RIVER)	HABITAT ALTERATIONS	9

St. Joseph/Maumee Watershed Restoration Action Strategy

ID	Waterbody	Parameter of Concern	Priority for TMDL development
OH65 10-1998	MAUMEE RIVER (ZUBER CUTOFF DITCH TO GORDON CREEK)	SILTATION ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN	9
OH65 17-1998	MAUMEE RIVER (OH/IND BORDER TO ZUBER CUTOFF DITCH)	SILTATION ORGANIC ENRICHMENT/LOW DISSOLVED OXYGEN	9

FCA - Fish Consumption Advisory

PCB - Polychlorinated Biphenyls

Hg - Mercury

***Only waters for which fish tissue data support issuance of fish consumption advisories are individually cited above. The Indiana Department of Health has issued a general fish consumption advisory for all other waters of the state. This advisory was based on extrapolation of the fish tissue data that were available and generally recommends that if no site-specific advisory is in place for a waterbody, the public should eat no more than one meal (8 oz.) per week of fish caught in these waters. Women of child bearing age, women who are breast feeding, and children up to 15 years of age should eat no more than one meal per month. The basis for this general advisory is widespread occurrence of mercury or PCBs (or both) in most fish sampled throughout the state. Please refer to the most recent Fish Consumption Advisory booklet available through the Indiana Department of Health (317/233-7808). Sources of the mercury and PCBs are unknown for the most part, but it is suspected that they result from air deposition.

St. Joseph/Maumee Watershed Restoration Action Strategy

TABLE 2-1: ST. JOSEPH-MAUMEE COUNTY POPULATION PROJECTIONS 1990-2020

County	1990	2000	2010	2020	Percent Change (1990 to 2020)
Adams	31095	33625	35278	36154	16
Allen	300836	331849	335140	343414	14
De Kalb	35324	40285	43869	45716	29
Noble	37877	46275	46584	48260	27
Steuben	27446	33214	34698	35989	31
Whitley	27651	30707	32429	33312	20

(from IBRC 1999)

TABLE 2-2: ST. JOSEPH-MAUMEE CITY AND TOWN POPULATION ESTIMATES

City/Town	Census 1990	Estimate 1996	Percent Change (1990 to 1996)
Altona	235	239	1
Auburn	9761	11732	20
Avilla	1351	1963	45
Butler	2608	2846	9
Clear Lake	272	269	-1
Corunna	230	241	4
Fort Wayne	202995	196708	-3
Garrett	5260	5574	5
Georgetown	2112	2578	22
Grabill	796	1012	27
Greendale	4435	4392	0
Hamilton	825	950	15
Huntertown	1326	1574	18
Leo-Cedarville	1815	2625	44
Monroeville	1222	1515	23
New Haven	11840	14531	22
Waterloo	2062	2280	10
Woodburn	1449	1818	25

(from IBRC 1997)

St. Joseph/Maumee Watershed Restoration Action Strategy

TABLE 2-3: LIVESTOCK IN THE ST. JOSEPH-MAUMEE WATERSHED

	1997 Livestock Inventory							
	Hogs and pigs		Cattle and calves		Sheep and lamb		Layers 20 weeks and older	
County	Number	State Rank*	Number	State Rank*	Number	State Rank*	Number	State Rank*
Adams	105431	9	@	@	@	@	942178	9
Allen	49783	30	19838	12	897	19	19780	31
De Kalb	18355	60	8762	47	584	40	382	59
Noble	43481	33	16262	15	1243	8	@	@
Steuben	6859	76	9257	40	@	@	262	67
Whitley	59829	24	9534	37	934	16	(D)	28

* State Rank is out of a total of 92 counties in Indiana

@ - indicates species is not in the top 4 for this county

D - Numbers not disclosed by USDA-NASS
(from USDA 1997)

St. Joseph/Maumee Watershed Restoration Action Strategy

TABLE 2-4: CROPS PRODUCED IN THE ST. JOSEPH-MAUMEE WATERSHED

	1997 Crops							
	Corn for grain		Soybeans for beans		Wheat		Hay crops	
County	Acres	State Rank*	Acres	State Rank*	Acres	State Rank*	Acres	State Rank*
Adams	70784	32	85457	15	11593	8	10073	26
Allen	85866	19	102944	5	29837	4	10510	22
De Kalb	36636	66	50246	52	11254	9	5659	45
Noble	58456	54	48990	53	6481	25	11470	15
Steuben	32152	72	25120	75	4483	44	9598	27
Whitley	48496	61	51150	51	12588	6	6883	33

* State Rank is out of a total of 92 counties in Indiana

@ - indicates species is not in the top 4 for this county

D - Numbers not disclosed by USDA-NASS
(from USDA 1997)

TABLE 2-5: OUTSTANDING RIVERS LIST FOR INDIANA

In 1993, the Natural Resources Commission adopted its "Outstanding Rivers List for Indiana." The listing was published in the Indiana Register on March 1 of that year as Information Bulletin #4 in Volume 16, Number 6, page 1677 through 1680 (sometimes cited as 16 IR 1677). The listing has also been specifically incorporated by reference into statutes and rules. Notably, the listing is referenced in the standards for utility line crossings within floodways, formerly governed by IC 14-28-2 and now controlled by 310 IAC 6-1-16 through 310 IAC 6-1-18. See, also, the general permit for logjam removals, implemented as an emergency rule and pending for adoption as a permanent rule at 310 IAC 6-1-20. Except where incorporated into a statute or rule, the listing is intended to provide guidance rather than to have regulatory application.

I. INTRODUCTION

To help identify the rivers and streams which have particular environmental or aesthetic interest, a special listing has been prepared by the division of outdoor recreation of the department of natural resources. The listing is a corrected and condensed version of a listing compiled by American Rivers and dated October 1990. There are about 2,000 river miles included on the listing, a figure which represents less than 9% of the estimated 24,000 total river miles in Indiana. The natural resources commission has adopted the listing as an official recognition of the resource values of these waters.

A river included in the listing qualifies under one or more of the following 22 categories. An asterisk indicates that all or part of the river segment was also included in the "Roster of Indiana Waterways Declared Navigable," 15 IR 2385 (July 1992). [Note: this listing is now included in the 1997 "Roster of Indiana Waterways Declared Navigable or Nonnavigable."] A river designated "EUW" is an exceptional use water. A river designated "HQW" is a high quality water, and a river designated "SS" is a salmonoid stream.

1. Designated National Wild and Scenic Rivers. Rivers that Congress has included in the National Wild and Scenic System pursuant to the National Wild and Scenic River Act, Public Law 90-452.
2. National Wild and Scenic Study Rivers. Rivers that Congress has determined should be studied for possible inclusion in the National Wild and Scenic Rivers System.
3. Federally Protected Rivers other than Wild and Scenic. Rivers subject to federal legal protection other than pursuant to the National Wild and Scenic Rivers Act, such as National Rivers and Waterways and National Recreation Areas.
4. State designated Scenic Rivers. Rivers included in state river conservation systems or otherwise protected pursuant to an act of the state legislature.
5. Nationwide Rivers Inventory Rivers. The 1,524 river segments identified by the National Park Service in its 1982 "Nationwide Rivers Inventory" as qualified for consideration for inclusion in the National Wild and Scenic Rivers System.
6. Hydro Ban Rivers. Rivers on which Congress has prohibited future hydropower development.
7. Rivers Identified in State Inventories or Assessments. Outstanding rivers from state inventories or assessments, i.e., rivers identified as having statewide or greater significance.
8. Atlantic Salmon Restoration Rivers. Rivers undergoing active Atlantic salmon restoration efforts and identified by the U.S. Fish and Wildlife Service for planned restoration.
9. Federal Public Lands Rivers. Rivers identified in U.S. Forest Service and Bureau of Land Management resource planning as potential additions to the National Wild and Scenic Rivers System.
10. State Fishing Rivers. Rivers identified by states as having outstanding fishing values, such as Blue Ribbon Trout Streams.
11. State Heritage Program Sites. Rivers identified by state natural heritage programs or similar state programs as having

St. Joseph/Maumee Watershed Restoration Action Strategy

outstanding ecological importance.

12. Priority Aquatic Sites. Rivers identified in "Priority Aquatic Sites for Biological Diversity Conservation," published by the Nature Conservancy in 1985.
13. Canoe Trails. State-designated canoe/boating routes.
14. Outstanding Whitewater Streams. Rivers listed in the American Whitewater Affiliation's 1990 Inventory of American Whitewater.
15. Locally Protected Rivers. Rivers protected through local and private protection strategies.
16. State Park Rivers. Rivers protected by inclusion in a state park or state preserve.
17. Other Rivers. Miscellaneous rivers identified as having outstanding ecological, recreational, or scenic importance.
18. High Water Quality Rivers. "Outstanding Resources Waters" designated by states and other rivers identified by states as having outstanding water quality.
19. National Natural Landmark Rivers. Rivers designated as, or included within, National Natural Landmarks.
20. State Study Rivers. Rivers that have been formally proposed for state protection or designation.
21. BOR Western Rivers. Rivers listed in the Bureau of Outdoor Recreation's 1982 "Western U.S. Water Plan" proposal as exhibiting identified free-flowing values.
22. State legislated Wabash River Heritage Corridor.

II. LISTING OF OUTSTANDING RIVERS AND STREAMS IN THE ST. JOSEPH-MAUMEE WATERSHED

River	Significance	County	Segment
Cedar Creek	4, 7, 11, 18 HQW	Allen, Dekalb	Dekalb C.R. 68 to St. Joseph River
Fish Creek	11	Dekalb, Steuben	Ohio/Indiana line to Indiana/Ohio Line

St. Joseph/Maumee Watershed Restoration Action Strategy

TABLE 2-6: SPECIAL AREAS IN THE ST. JOSEPH-MAUMEE WATERSHED

County	Special Area	Manager	Access
ADAMS	BALTZELL-LENHART WOODS NATURE PRESERVE	DNR NATURE PRESERVES	OPEN-
ADAMS	BELLMONT RECREATION AREA	LOCAL- NORTH ADAMS SCHOOL BOARD	OPEN-
ADAMS	FIELDS MEMORIAL PARK	LOCAL- ADAMS CO. PARK BOARD	OPEN-
ADAMS	KEKIONGA PARK	LOCAL- DECATUR PARK BOARD	OPEN-
ADAMS	KEKIONGA/RIVERSIDE TRAILWAY	LOCAL- DECATUR PARK BOARD	OPEN-
ADAMS	LIMBERLOST COUNTY PARK	LOCAL- ADAMS CO. PARK BOARD	OPEN-
ADAMS	LINN GROVE COUNTY PARK	LOCAL- ADAMS CO. PARK BOARD	OPEN-
ADAMS	MONROE CITY PARK	LOCAL- ADAMS CO. PARK BOARD	OPEN-
ADAMS	MUNRO PRESERVE (ACRES)	PRIV- ACRES INC.	OPEN-
ALLEN	BARRETT NATURE PRESERVE (CONSERVATION EASEMENT)	DNR NATURE PRESERVES	RESTRICTED-
ALLEN	BARRETT OAK HILL NATURE PRESERVE	DNR NATURE PRESERVES	RESTRICTED-
ALLEN	BICENTENNIAL WOODS NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
ALLEN	CAMP MCMILLAN	PRIV- GIRL SCOUTS OF AMERICA	RESTRICTED-
ALLEN	CEDAR CREEK/RODENBECK	PRIV- IZAAK WALTON LEAGUE	RESTRICTED-
ALLEN	FOGWELL FOREST NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
ALLEN	FOSTER PARK	LOCAL- FORT WAYNE PARK BOARD	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
ALLEN	FOX ISLAND NATURE PRESERVE	LOCAL- ALLEN CO. PARKS AND RECREATION	OPEN-
ALLEN	FOX ISLAND PARK	LOCAL- ALLEN CO. PARKS AND RECREATION	OPEN-
ALLEN	FOXFIRE WOODS	PRIV- ACRES INC.	OPEN-
ALLEN	FRANKE PARK	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	FT. WAYNE RIVER GREENWAY - PHASE II	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	HAVENHURST PARK	LOCAL- NEW HAVEN-ADAMS TWP. PARK BOARD	OPEN-
ALLEN	JEHL PARK	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	JURY PARK	LOCAL- NEW HAVEN-ADAMS TWP. PARK BOARD	OPEN-
ALLEN	LINDENWOOD NATURE PRESERVE	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	MAUMEE PARK	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	MAUMEE RIVER OVERLOOK	PRIV- ACRES INC.	RESTRICTED-
ALLEN	MENABB-WALTER NATURE PRESERVE	PRIV- ACRES INC.	RESTRICTED- BY PERMISSION ONLY
ALLEN	MENGERSON NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
ALLEN	MENO-AKI NATURE PRESERVE	LOCAL- ALLEN CO. PARKS AND REC.	OPEN-
ALLEN	METEA PARK	LOCAL- ALLEN CO. PARKS AND RECREATION	OPEN-
ALLEN	MOSER PARK	LOCAL- NEW HAVEN-ADAMS TWP. PARK BOARD	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
ALLEN	OLD SCHOOL PARK	LOCAL-	RESTRICTED-
ALLEN	RODENBECK (ALBERT D.) NATURE PRESERVE (ORIGINAL)	PRIV- IZAAK WALTON LEAGUE	RESTRICTED- BY PERMISSION ONLY
ALLEN	RODENBECK (ALBERT D.) NATURE PRESERVE DUNTEN ADDT.	PRIV- IZAAK WALTON LEAGUE	CLOSED-
ALLEN	SHERMAN ST. RIVER GREENWAY	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	ST. MARY'S RIVER GREENWAY	LOCAL- FORT WAYNE PARK BOARD	OPEN-
ALLEN	VANDOLAH NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
NOBLE	AVILLA PARK	LOCAL- AVILLA PARK BOARD	OPEN-
NOBLE	BEAR LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	BENDER (LLOYD W.) MANAGED AREA	PRIV- ACRES INC.	RESTRICTED-
NOBLE	BENDER (LLOYD W.) NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
NOBLE	BIG LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	CHAIN O' LAKES STATE PARK	DNR STATE PARKS	OPEN-
NOBLE	CLOCK CREEK	PRIV- THE NATURE CONSERVANCY	RESTRICTED-
NOBLE	CRANE LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	CREE LAKE P.A.S./P.F.A.	DNR FISH & WILDLIFE	OPEN-
NOBLE	CROMWELL PARK	LOCAL- CROMWELL PARK BOARD	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
NOBLE	CROOKED LAKE NATURE PRESERVE	DNR NATURE PRESERVES	OPEN-
NOBLE	CROOKED LAKE NATURE PRESERVE (RALPH GATES ADDTN.)	PRIV- ACRES INC.	OPEN-
NOBLE	EAGLE LAKE WETLANDS CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
NOBLE	GENE STRATTON PORTER STATE HISTORIC SITE	DNR STATE MUSEUM AND HISTORIC SITES	OPEN-
NOBLE	HAMMER (ART) WETLANDS ADDITION	PRIV- ACRES INC.	OPEN-
NOBLE	HAMMER (ART) WETLANDS NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
NOBLE	INDIAN VILLAGE LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	KELLY STREET PARK	LOCAL- ROME CITY PARK BOARD	OPEN-
NOBLE	KENDALLVILLE FAIRGROUNDS	LOCAL- KENDALLVILLE PARK BOARD	OPEN-
NOBLE	KNAPP LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	LITTLE LONG LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	LONIDAW NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
NOBLE	MAINLAND PARK	LOCAL- ROME CITY PARK BOARD	OPEN-
NOBLE	MALLARD ROOST WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
NOBLE	MALLARD ROOST WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	RESTRICTED-
NOBLE	MARTIN KENNY MEMORIAL PARK	LOCAL- LIGONIER PARK BOARD	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
NOBLE	MERRY LEA ENVIRONMENTAL CENTER	UNIV- GOSHEN COLLEGE	OPEN-
NOBLE	MERRY LEA NATURE PRESERVE (ADDITION)	UNIV- GOSHEN COLLEGE	RESTRICTED- BY PERMISSION ONLY
NOBLE	MERRY LEA NATURE PRESERVE CENTRAL (ORIGINAL)	UNIV- GOSHEN COLLEGE	RESTRICTED- BY PERMISSION ONLY
NOBLE	MERRY LEA NATURE PRESERVE EAST (ORIGINAL)	UNIV- GOSHEN COLLEGE	RESTRICTED- BY PERMISSION ONLY
NOBLE	ROME CITY WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
NOBLE	ROUND LAKE WETLANDS (ACRES)	PRIV- ACRES INC.	OPEN-
NOBLE	SACARIDER LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	SKINNER LAKE (NOBLE) PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	SKINNER LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	SMALLEY LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	SPARTA LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
NOBLE	SPURGEON (EDNA W.) NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
NOBLE	SWAMP ANGEL NATURE PRESERVE	PRIV- THE NATURE CONSERVANCY	RESTRICTED- BY PERMISSION ONLY
NOBLE	TRI-COUNTY FISH AND WILDLIFE AREA	DNR FISH & WILDLIFE	OPEN-
NOBLE	WEST LAKES (ELKHART) CONSERVATION INC TRACT	DNR FISH & WILDLIFE	OPEN-
NOBLE	WILLIAM MALLE(ELKHART R.-DUKE BRDG)MEMORIAL P.A.S.	DNR FISH & WILDLIFE	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
STEU BEN	ANSPAUGH (LOON LAKE) WILDLIFE TRUST AREA	DNR FISH & WILDLIFE	OPEN-
STEU BEN	BALL LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	BEAVER DAM LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	BEECHWOOD NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
STEU BEN	BIG OTTER LAKE WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
STEU BEN	BINKLEY BOG NATURE PRESERVE	DNR NATURE PRESERVES	RESTRICTED-
STEU BEN	CEDAR LAKE (MARSH) WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
STEU BEN	CHEESEBORO LAKE	PRIV- THE NATURE CONSERVANCY	RESTRICTED-
STEU BEN	CLEAR LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	DOUGLAS (BAXTER) WOODS NATURE PRESERVE	PRIV- THE NATURE CONSERVANCY	OPEN-
STEU BEN	FAWN RIVER STATE FISH HATCHERY	DNR FISH & WILDLIFE	RESTRICTED- BY PERMISSION ONLY
STEU BEN	FISH LAKE (FREMONT) PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	FOX LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	GOLDEN LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	HAMILTON LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	HAMILTON LAKE WATER CONTROL STRUCTURE	DNR FISH & WILDLIFE	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
STEU BEN	JIMMERSON LAKE (NEVADA MILLS) WETLAND CONSERVATION	DNR FISH & WILDLIFE	OPEN-
STEU BEN	LIME LAKE MANAGED AREA (DNP)	DNR NATURE PRESERVES	RESTRICTED-
STEU BEN	LIME LAKE MANAGED AREA (TNC)	PRIV- THE NATURE CONSERVANCY	RESTRICTED-
STEU BEN	LIME LAKE(LAKE GAGE) P.A.S./P.F.A.	DNR FISH & WILDLIFE	OPEN-
STEU BEN	LITTLE GRASS LAKE	PRIV- THE NATURE CONSERVANCY	OPEN-
STEU BEN	LITTLE TURKEY LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	LOON LAKE NATURE PRESERVE	DNR NATURE PRESERVES	OPEN-
STEU BEN	LOON LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	MARSH LAKE NATURE PRESERVE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	MARSH LAKE TNC	PRIV- THE NATURE CONSERVANCY	OPEN-
STEU BEN	MARSH LAKE WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
STEU BEN	MCCLUE (CHARLES) NATURE PRESERVE	LOCAL- STEUBEN CO. PARKS & RECREATION DEPT.	OPEN-
STEU BEN	OTTER LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	PIGEON LAKE PUBLIC ACCESS SITE	DNR FISH & WILDLIFE	OPEN-
STEU BEN	PIGEON RIVER FISH AND WILDLIFE AREA	DNR FISH & WILDLIFE	OPEN-
STEU BEN	POKAGON STATE PARK	DNR STATE PARKS	OPEN-

St. Joseph/Maumee Watershed Restoration Action Strategy

County	Special Area	Manager	Access
STEU BEN	POKAGON STATE PARK ADDITION	DNR STATE PARKS	OPEN-
STEU BEN	POTAWATOMI NATURE PRESERVE (ADDITION)	DNR STATE PARKS	OPEN-
STEU BEN	POTAWATOMI NATURE PRESERVE (ORIGINAL)	DNR STATE PARKS	OPEN-
STEU BEN	ROPCHAN MEMORIAL NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
STEU BEN	ROPCHAN WETLAND CONSERVATION AREA	DNR FISH & WILDLIFE	OPEN-
STEU BEN	ROPCHAN WILDLIFE REFUGE NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
STEU BEN	TAMARACK LAKE	PRIV- THE NATURE CONSERVANCY	OPEN-
STEU BEN	WING HAVEN (SEVEN SISTERS LAKES) AREA	PRIV- ACRES INC.	RESTRICTED-
STEU BEN	WOODLAND BOG NATURE PRESERVE	PRIV- ACRES INC.	OPEN-
WHIT LEY	CHURUBUSCO COMMUNITY PARK	LOCAL- CHURUBUSCO PARKS DEPARTMENT	OPEN-
WHIT LEY	CROOKED LAKE NATURE PRESERVE	DNR NATURE PRESERVES	OPEN-
WHIT LEY	GALE HAGAN MEMORIAL PARK	LOCAL- SOUTH WHITLEY PARKS DEPT.	OPEN-
WHIT LEY	MERRY LEA ENVIRONMENTAL CENTER	UNIV- GOSHEN COLLEGE	OPEN-
WHIT LEY	MORSCHES PARK	LOCAL- COLUMBIA CITY PARK BOARD	OPEN-
WHIT LEY	TRI-LAKES STATE FISH HATCHERY	DNR FISH & WILDLIFE	RESTRICTED- BY PERMISSION ONLY

TABLE 2-7: 1995 WATER USE INFORMATION FOR THE ST. JOSEPH-MAUMEE WATERSHED

Population and Water Use totals	1995
Total population in the watershed (thousands)	215.81
Public Water Supply	1995
Population served by public groundwater supply (thousands)	42.49
Population served by surface water supply (thousands)	126.27
Total population served by public water supply (thousands)	168.76
Total groundwater withdrawals (mgd)	5.27
Total surface water withdrawals (mgd)	33.7
Total water withdrawals (mgd)	38.97
Total per capita withdrawal (gal/day)	543.63
Population self-supplied with water (thousands)	47.05
Commercial Water Use	1995
Groundwater withdrawal for commercial use (mgd)	0.51
Surface water withdrawal for commercial use (mgd)	0.23
Deliveries from public water supplies for commercial use (mgd)	1.94
Total commercial water use (mgd)	0.41
Industrial Water Use	1995
Groundwater withdrawal for industrial use (mgd)	1.71
Surface water withdrawals for industrial use (mgd)	4.22
Deliveries from public water suppliers for industrial use (mgd)	6.63

St. Joseph/Maumee Watershed Restoration Action Strategy

Total industrial water use (mgd)	0.75
Agricultural Water Use	1995
Groundwater withdrawals for livestock use (mgd)	0.49
Surface water withdrawals for livestock use (mgd)	0.48
Total livestock water use (mgd)	0.79
Groundwater withdrawals for irrigation (mgd)	0.18
Surface water withdrawals for irrigation (mgd)	0.11
Total irrigation water use (mgd)	0.26

Notes:

mgd: million gallons per day

gal/day: gallons per day

(from USGS 2001)

- The water-use information presented in this table was compiled from information provided in the U.S. Geological Survey's National Water-Use Information Program data system for 1990 and 1995. The National Water-Use Information Program is responsible for compiling and disseminating the nation's water-use data. The U.S. Geological Survey works in cooperation with local, State, and Federal environmental agencies to collect water-use information at a site-specific level. Every five years, the U.S. Geological Survey compiles data at the state and hydrologic region level into a national water-use data system and publishes a national circular.

TABLE 3-1: CAUSES OF WATER POLLUTION AND CONTRIBUTING ACTIVITIES

Cause	Activity associated with cause
<i>E. coli</i>	Failing septic systems, direct septic discharge, animal waste (including runoff from livestock operations and impacts from wildlife), improperly disinfected wastewater treatment plant effluent
Toxic Chemicals	Pesticide/herbicide applications, household hazardous waste, disinfectants, automobile fluids, accidental spills, illegal dumping, urban stormwater runoff, direct septic discharge, industrial effluent
Oxygen-Consuming Substances	Wastewater effluent, leaking sewers and septic tanks, direct septic discharge, animal waste
Nutrients	Fertilizer on agricultural crops and residential/commercial lawns, animal wastes, leaky sewers and septic tanks, direct septic discharge, atmospheric deposition, wastewater treatment plants

TABLE 3-2: COMBINED SEWER OVERFLOWS IN THE ST. JOSEPH-MAUMEE WATERSHED

<u>Community</u>	<u>CSO Outfalls</u>
Auburn	4
Avilla	4
Butler	2
Fort Wayne	42
New Haven	4
Waterloo	3

(from ICAA 2000)

TABLE 3-3: NPDES PERMITTED FACILITIES IN THE ST. JOSEPH-MAUMEE WATERSHED

NPDES	Facility Name	Major/ Minor	City	County	Status
IN0000361	COOPER TIRE & RUBBER COMPANY	MINOR	AUBURN	DE KALB	ACTIVE
IN0000370	DANA CORP. SPICER CLUTCH DIV.	MINOR	AUBURN	DE KALB	INACTIVE
IN0000400	VALID KVVHJFDH	MINOR		ALLEN	INACTIVE
IN0000418	PAUL C. BRUDI STONE AND GRAVEL	MINOR		ALLEN	INACTIVE
IN0000442	PHELPS DODGE MAGNET WIRE CO.	MAJOR	FORT WAYNE,	ALLEN	INACTIVE
IN0000451	FRANCE STONE, MIDWEST QUARRY	MINOR	WOODBURN,	ALLEN	INACTIVE
IN0000469	HANSON AGGREGATES, WOODBURN Q.	MINOR	WOODBURN	ALLEN	ACTIVE
IN0000477	NORFOLK & WESTERN RR, FT WAYNE	MINOR		ALLEN	INACTIVE
IN0000485	NORFOLK & WESTERN RAILWAY CO.	MINOR	FORT WAYNE	ALLEN	ACTIVE
IN0000507	UNIROYAL GOODRICH TIRE COMPANY	MINOR	WOODBURN	ALLEN	ACTIVE
IN0000515	CITATION BOHN ALUMINUM	MINOR	BUTLER	DE KALB	ACTIVE
IN0000540	KITCHEN QUIP, INC.	MINOR	WATERLOO	DE KALB	INACTIVE
IN0000566	AUBURN GEAR INC.	MINOR	AUBURN	DE KALB	ACTIVE
IN0000574	EAGLE-PICHER PLASTIC DIVISION	MINOR	GRABILL	ALLEN	INACTIVE
IN0000582	STANADYNE AUTOMOTIVE PRODUCTS	MINOR	GARRETT	DE KALB	INACTIVE
IN0000621	BEATRICE CHEESE COMPANY	MINOR	AUBURN	DE KALB	INACTIVE
IN0000639	UNIVERSAL TOOL AND STAMPING CO	MINOR	BUTLER	DE KALB	INACTIVE
IN0000647	FALSTAFF BREWING CORPORATION	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0000655	ITT AEROSPACE/COMMUNICATIONS D	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0000728	IND & MICH ELECTRIC CO-ROBISON	MINOR		ALLEN	INACTIVE
IN0000825	PURITAN UTIL-AREA 3 WATER PLT	MINOR		ALLEN	INACTIVE
IN0000833	PURITAN UTIL-AREA 5 WATER PLT	MINOR		ALLEN	INACTIVE
IN0000841	CLEARWATER UTIL., INC FT WAYNE	MINOR	FORT WAYNE	ALLEN	INACTIVE

St. Joseph/Maumee Watershed Restoration Action Strategy

NPDES	Facility Name	Major/ Minor	City	County	Status
IN0000868	RIEKE CORPORATION	MINOR	AUBURN	DE KALB	ACTIVE
IN0000906	MONROEVILLE WATER WORKS	MINOR	MONROEVILLE	ALLEN	INACTIVE
IN0000949	GLADIEUX REFINERY, INC.	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0000957	STAUB BROS INC	MINOR		ALLEN	INACTIVE
IN0000965	NIPSCO,	MINOR		ALLEN	INACTIVE
IN0020346	NEW HAVEN STP	MINOR	NEW HAVEN	ALLEN	ACTIVE
IN0020664	AVILLA MUNICIPAL STP	MINOR	AVILLA	NOBLE	ACTIVE
IN0020672	AUBURN MUNICIPAL STP	MAJOR	AUBURN	DE KALB	ACTIVE
IN0020711	WATERLOO MUNICIPAL STP	MINOR	WATERLOO	DE KALB	ACTIVE
IN0021407	WOODBURN MUNICIPAL STP	MINOR	WOODBURN	ALLEN	ACTIVE
IN0021423	MONROEVILLE MUNICIPAL STP	MINOR	MONROEVILLE	ALLEN	ACTIVE
IN0022462	BUTLER MUNICIPAL STP	MINOR	BUTLER	DE KALB	ACTIVE
IN0022969	GARRETT MUNICIPAL STP	MINOR	GARRETT	DE KALB	ACTIVE
IN0023001	GRABIL MUNICIPAL STP	MINOR		ALLEN	INACTIVE
IN0023116	HUNTERTOWN MUNICIPAL STP	MINOR		ALLEN	INACTIVE
IN0025127	INDIANA AND MICH ELEC CO OFFIC	MINOR		DE KALB	INACTIVE
IN0025216	WOODLAN HIGH SCHOOL	MINOR	WOODBURN	ALLEN	INACTIVE
IN0025241	HERITAGE HIGH SCHOOL	MINOR	MONROEVILLE	ALLEN	INACTIVE
IN0025259	HARLAN ELEM SCHOOL TRMT PLT	MINOR		ALLEN	INACTIVE
IN0025267	LEO ELEM AND H.S. TRMT PLT	MINOR		ALLEN	INACTIVE
IN0025691	INTERNATIONAL HARVESTER, FORT	MINOR		ALLEN	INACTIVE
IN0026808	ESSEX INTERNATIONAL INC.	MINOR		ALLEN	INACTIVE
IN0029955	HIDDEN VALLEY MOBLE HOME PARK	MINOR	GARRETT	DE KALB	ACTIVE
IN0031330	AUBURN REST AREA-SOUTHBOUND	MINOR		DE KALB	INACTIVE

St. Joseph/Maumee Watershed Restoration Action Strategy

NPDES	Facility Name	Major/ Minor	City	County	Status
IN0031348	AUBURN REST AREA-NORTHBOUND	MINOR		DE KALB	INACTIVE
IN0031755	LAOTTO ELEMENTARY SCHOOL	MINOR	LAOTTO	NOBLE	INACTIVE
IN0032018	EDMUND CRANE CORPORATION	MINOR		DE KALB	INACTIVE
IN0032107	INDIAN SPRINGS CAMPGROUND	MINOR	GARRETT	DE KALB	ACTIVE
IN0032191	FORT WAYNE MUNICIPAL STP	MAJOR	FORT WAYNE	ALLEN	ACTIVE
IN0032981	RALPH SECHLER & SONS, INC.	MINOR	SAINT JOE	DE KALB	ACTIVE
IN0035301	CLEARWATER UTILITIES COLLECTIO	MINOR		ALLEN	INACTIVE
IN0035319	DIVERSIFIED UTILITIES INC-MIDW	MINOR		ALLEN	INACTIVE
IN0035327	DIVERSIFIED UTILITIES INC-LAKE	MINOR		ALLEN	INACTIVE
IN0035335	DIVERSIFIED UTILITIES INC-MAUM	MINOR		ALLEN	INACTIVE
IN0035351	DIVERSIFIED UTILITIES INC-LIBE	MINOR		ALLEN	INACTIVE
IN0035386	PINE VALLEY WWTP	MINOR		ALLEN	INACTIVE
IN0036161	REA MAGNET WIRE CO., INC.	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0037150	SOMERDALE MOBILE HOME PARK	MINOR		ALLEN	INACTIVE
IN0038491	AUBURN REST AREA I-69 SOUTH	MINOR	AUBURN	DE KALB	ACTIVE
IN0038504	AUBURN REST AREA I-69 NORTH	MINOR	AUBURN	DE KALB	ACTIVE
IN0040096	HAMILTON MUNICIPAL STP	MINOR	HAMILTON	STEUBEN	INACTIVE
IN0040568	SAINT JOE MUNICIPAL STP	MINOR		DE KALB	INACTIVE
IN0042137	NAVISTAR INTERNATIONAL COMPANY	MINOR		ALLEN	INACTIVE
IN0042561	WAWASEE SEWER AND WATER	MINOR		NOBLE	INACTIVE
IN0043419	HAMILTON SHORES MOBILE HOME PA	MINOR		STEUBEN	INACTIVE
IN0044369	GRABILL WATER WORKS	MINOR	GRABILL	ALLEN	ACTIVE
IN0044415	WOODBURN CHRISTIAN CHILDRENS	MINOR	WOODBURN	ALLEN	INACTIVE
IN0044628	IMPERIAL ESTATES MOBILE HP-NPR	MINOR		STEUBEN	INACTIVE

St. Joseph/Maumee Watershed Restoration Action Strategy

NPDES	Facility Name	Major/ Minor	City	County	Status
IN0046043	SPX - CONTECH DIVISION	MINOR	AUBURN	DE KALB	ACTIVE
IN0046248	NUCOR FASTENER PLANT	MINOR	SAINT JOE	DE KALB	INACTIVE
IN0046761	TOWER AUTOMOTIVE, INC.	MINOR	AUBURN	DE KALB	ACTIVE
IN0047473	CORUNNA MUNICIPAL STP	MINOR	CORUNNA	DE KALB	ACTIVE
IN0048470	BUTLER PUBLIC WATER SUPPLY	MINOR	BUTLER	DE KALB	INACTIVE
IN0048682	ITT AEROSPACE/OPTICAL SINGARS	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0049433	WATERLOO PUBLIC WATER SUPPLY	MINOR	WATERLOO	DE KALB	INACTIVE
IN0050822	HAMILTON LAKE C.D.	MINOR	HAMILTON	STEUBEN	ACTIVE
IN0050920	BEN-MAR CHATEAU MHP	MINOR	GARRETT	DE KALB	INACTIVE
IN0051063	RIVERDALE ELEMENTARY SCHOOL	MINOR	SAINT JOE	DE KALB	INACTIVE
IN0051136	VULCRAFT DIV.,NUCOR CORP.	MINOR	SAINT JOE	DE KALB	INACTIVE
IN0051659	DEKALB MOLDED PLASTICS COMPANY	MINOR	BUTLER	DE KALB	INACTIVE
IN0052035	AVILLA PUBLIC WATER SUPPLY	MINOR	AVILLA	NOBLE	ACTIVE
IN0052141	HAMILTON PUBLIC WATER SUPPLY	MINOR	HAMILTON	STEUBEN	INACTIVE
IN0052183	HAVENWOOD FOREST SUBD.	MINOR	WOODBURN	ALLEN	ACTIVE
IN0053651	AUBURN FOUNDRY, INC. PLANT #1	MINOR	AUBURN	DE KALB	INACTIVE
IN0054046	AUBURN FOUNDRY, INC.(LANDFILL)	MINOR	AUBURN	DE KALB	INACTIVE
IN0054429	CHEMICAL WASTE MGT. OF INDIANA	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0054518	ALLEN COUNTY MEMORIAL COLISEUM	MINOR	FORT WAYNE	ALLEN	INACTIVE
IN0055034	MAGNAVOX GOVT & INDL ELECTRO	MINOR	AUBURN,	DE KALB	ACTIVE
IN0055042	PHILLIPS TECHNOLOGIES	MINOR	AUBURN,	DE KALB	INACTIVE
IN0055808	DEKALB CO. E. COMM. SCHOOL DIS	MINOR	BUTLER	DE KALB	ACTIVE
IN0056634	STAFFORD GRAVEL	MINOR	BUTLER	DE KALB	INACTIVE
IN0057851	NORTHCREST SHOPPING CENTER	MINOR	FORT WAYNE,	ALLEN	INACTIVE

St. Joseph/Maumee Watershed Restoration Action Strategy

NPDES	Facility Name	Major/ Minor	City	County	Status
IN0058441	ST. JOE - SPENCERVILLE RSD	MINOR	SAINT JOE	DE KALB	ACTIVE
IN0058483	DEKALB COUNTY AIRPORT	MINOR	AUBURN	DE KALB	INACTIVE
IN0058611	LAOTTO REGIONAL SEWER DISTRICT	MINOR	LAOTTO	NOBLE	ACTIVE
IN0059021	STEEL DYNAMICS, INC.	MINOR	BUTLER,	DE KALB	ACTIVE
IN0060127	DUPONT WATER TREATMENT PLANT	MINOR	FORT WAYNE	ALLEN	ACTIVE
IN0060216	HAMILTON WATER TREATMENT PLANT	MINOR	HAMILTON	STEUBEN	ACTIVE
IN0061051	THREE RIVERS FILTRATION PLANT	MINOR	FORT WAYNE	ALLEN	ACTIVE
IN0061212	LAKE RIVER WATER TP	MINOR	FT. WAYNE	ALLEN	ACTIVE
IN0109771	BAER FIELD WATER PLANT BOARD O	MINOR		ALLEN	INACTIVE
IN0109983	MODERNAIR CORP (THE ARO CORP.)	MINOR	WATERLOO	DE KALB	INACTIVE
ING250015	ALLEN CO WAR MEMORIAL COLISEUM	MINOR	FORT WAYNE	ALLEN	INACTIVE
ING250019	AUBURN FOUNDRY, INC. PLANT #2	MINOR	AUBURN	DE KALB	ACTIVE
ING250020	AUBURN FOUNDRY, INC. PLANT #1	MINOR	AUBURN	DE KALB	ACTIVE
ING250048	EATON CORPORATION, CLUTCH DIV.	MINOR	AUBURN	DE KALB	ACTIVE
ING250050	LINTEC	MINOR	AVILLA	NOBLE	ACTIVE
ING340018	MARATHON OIL CO, ASPHALT TERMI	MINOR	WATERLOO,	DE KALB	INACTIVE
ING340037	MARATHON ASHLAND, WATERLOO ASP	MINOR	WATERLOO	DE KALB	ACTIVE
ING490043	STAFFORD GRAVEL, WASHLER PIT	MINOR	BUTLER	DE KALB	ACTIVE
ING490049	HANSON AGGREGATES, MIDWEST Q.	MINOR	EDGERTON	ALLEN	ACTIVE
INL020346	NEW HAVEN STP	MINOR		ALLEN	ACTIVE
INL020664	AVILLA MUNICIPAL STP	MINOR		NOBLE	ACTIVE
INL020672	AUBURN MUNICIPAL STP	MINOR		DE KALB	ACTIVE
INL020711	WATERLOO MUNICIPAL STP	MINOR		DE KALB	ACTIVE
INL022462	BUTLER MUNICIPAL STP	MINOR		DE KALB	ACTIVE

St. Joseph/Maumee Watershed Restoration Action Strategy

NPDES	Facility Name	Major/ Minor	City	County	Status
INL022969	GARRETT MUNICIPAL STP	MINOR		DE KALB	ACTIVE
INL025241	HERITAGE HIGH SCHOOL	MINOR		ALLEN	ACTIVE
INL032191	FORT WAYNE MUNICIPAL STP	MINOR		ALLEN	ACTIVE
INL047473	CORUNNA MUNICIPAL STP	MINOR		DE KALB	ACTIVE
INL050822	HAMILTON LAKE C.D.	MINOR		STEUBEN	ACTIVE
INL051063	RIVERDALE ELEMENTARY SCHOOL	MINOR		DE KALB	ACTIVE
INL055808	EASTSIDE H.S. & BUTLER ELEM	MINOR		DE KALB	ACTIVE
INP000023	DURA AUTOMOTIVE SYSTEMS	MINOR	BUTLER	DE KALB	ACTIVE
INP000044	INDIANA DECORATIVE PROD. PLT#2	MINOR	WATERLOO	DE KALB	INACTIVE
INP000072	STEEL DYNAMICS INC.	MINOR	BUTLER	DE KALB	ACTIVE
INP000093	CITATION BOHN ALUMINUM	MINOR	BUTLER	DE KALB	ACTIVE
INP000104	PRINCE MANUFACTURING N	MINOR	AVILLA	NOBLE	ACTIVE
INP000105	PRINCE MANUFACTURING	MINOR	WATERLOO	DE KALB	ACTIVE
INP000121	AFFILIATED METALS COMPANY	MINOR	BUTLER	DE KALB	ACTIVE
INP000128	KITCO-LINTEC	MINOR	AVILLA	NOBLE	ACTIVE
INP000138	NUCOR FASTENER	MINOR	ST. JOE	DE KALB	ACTIVE
INP000139	VULCRAFT, DIVISION NUCOR CORP.	MINOR	ST. JOE	DE KALB	ACTIVE
INP000146	TERNET METAL FINISHING, INC.	MINOR	AVILLA	NOBLE	INACTIVE
INP000217	TERNET METAL FINISHING, #2	MINOR	AVILLA	NOBLE	ACTIVE
INP000219	NEW MILLENIUM BUILDING SYSTEMS	MINOR	BUTLER	DE KALB	ACTIVE
INP000229	RHINEHART FINISHING, LLC	MINOR	SPENCERVILLE	DE KALB	ACTIVE

(from IDEM 2001)

TABLE 4-2: ISDH DEFINITIONS FOR FISH CONSUMPTION ADVISORY GROUPS

Group 1	Unrestricted consumption
Group 2	One meal per week (52 meals per year) for adult males and females. One meal per month for women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15.
Group 3	One meal per month (12 meals per year) for adult males and females. Women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15 do not eat.
Group 4	One meal every two months (six meals per year) for adult males and females. Women who are pregnant or breastfeeding, women who plan to have children, and children under the age of 15 do not eat.
Group 5	No consumption (DO NOT EAT)

Carp generally are contaminated with both PCBs and mercury. Except as otherwise noted, carp in all Indiana rivers and streams fall under the following risk groups:

Carp, 15-20 inches - Group 3

Carp, 20-25 inches - Group 4

Carp over 25 inches - Group 5

(from ISDH, IDNR, and IDEM 2001)

St. Joseph/Maumee Watershed Restoration Action Strategy

TABLE 4-3: 2001 INDIANA FISH CONSUMPTION ADVISORY

Location	Species	Fish Size (inches)	Contaminant	Group
Bixler Lake				
<i>Noble County</i>	Bullhead	Up to 11 11+	○ ○	2 3
	Largemouth Bass	6-10 10+	○ ○	2 3
Hamilton Lake				
<i>Steuben County</i>	Largemouth Bass	16-19 19+	○ ○	2 3
Henderson Lake				
<i>Noble County</i>	Bluegill	5-6 6+	■ ■	3 4
	Carp	17+	■	3
	Largemouth Bass	16+	○	2
Long Lake				
<i>Steuben County</i>	Largemouth Bass	9-13 13+	○ ○	2 3
McClish Lake				
<i>Steuben County</i>	Largemouth Bass	8-13 13+	○ ○	2 3
Maumee River				
<i>Allen County</i>	Channel Catfish	14-16 16+	■ ■	3 4
	Largemouth Bass	9+	■	3

St. Joseph/Maumee Watershed Restoration Action Strategy

	River Redhorse	12-14 14+	■○ ■○	3 4
	Rock Bass	7-8 8+	■ ■	3 4
	Sauger	15-24 24+	■○ ■○	2 3
	Shorthead Redhorse	14-16 16+	■○ ■○	3 4
St. Joseph River (Maumee River Basin)				
<i>Allen County</i>	Black Crappie	9-11 11+	■ ■	3 4
	Black Redhorse	13-16 16+	■ ■	3 4
	Channel Catfish	20-24 25-26 26+	■○ ■○ ■○	3 4 5
	Golden Redhorse	12-13 13+	■ ■	3 4
	Rock Bass	7-9 9+	■ ■	3 4

*○ = Mercury, ■ = PCBs
(from ISDH, IDNR, and IDEM 2001)

TABLE 4-4: CRITERIA FOR USE SUPPORT ASSESSMENT (U.S. EPA 305(B) GUIDELINES)

Parameter	Fully Supporting	Partially Supporting	Not Supporting
Aquatic Life Use Support			
Toxicants	Metals were evaluated on a site by site basis and judged according to magnitude of exceedance and the number of times exceedances occurred.		
Conventional inorganics	There were very few water quality violations, almost all of which were due to natural conditions.		
Benthic aquatic macroinvertebrate Index of Biotic Integrity (mIBI)	mIBI ≥ 4.	mIBI < 4 and ≥ 2.	mIBI < 2.
Qualitative habitat use evaluation (QHEI)	QHEI ≥ 64.	QHEI < 64 and ≥ 51.	QHEI < 51.
Fish community (fIBI) (Lower White River only)	IBI ≥ 44.	IBI < 44 and ≥ 22	IBI < 22.
Sediment (PAHs = polynuclear aromatic hydrocarbons. AVS/SEM = acid volatile sulfide/ simultaneously extracted metals.)	All PAHs ≤ 75 th percentile. All AVS/SEMs ≤ 75 th percentile. All other parameters ≤ 95 th percentile.	PAHs or AVS/SEMs > 75 th percentile. (Includes Grand Calumet River and Indiana Harbor Canal sediment results, and so is a conservative number.)	Parameters > 95 th percentile as derived from IDEM Sediment Contaminants Database.
Indiana Trophic State Index (lakes only)	Nutrients, dissolved oxygen, turbidity, algal growth, and sometimes pH were evaluated on a lake-by-lake basis. Each parameter judged according to magnitude.		
Fish Consumption			
Fish tissue	No specific Advisory*	Limited Group 2 - 4 Advisory*	Group 5 Advisory*
* Indiana Fish Consumption Advisory, 1997, includes a statewide advisory for carp consumption. This was not included in individual waterbody reports because it obscures the magnitude of impairment caused by other parameters.			
Recreational Use Support (Swimmable)			
Bacteria (cfu = colony forming units.)	No more than one grab sample slightly > 235 cfu/100ml, and geometric mean not exceeded.	No samples in this classification.	One or more grab sample exceeded 235 cfu/100ml, and geometric mean exceeded.

St. Joseph/Maumee Watershed Restoration Action Strategy

(from Indiana Water Quality Report for 1998 (IDEM 1998))

TABLE 5-1: TYPES OF PERMITS ISSUED UNDER THE NPDES PROGRAM

Type of Permit	Subtype	Comment
Municipal, Semi-Public or State (sanitary discharger)	Major	A facility owned by a municipality with a design flow Municipal of 1 MGD or greater (Cities, Towns, Regional Sewer Districts)
	Minor	Any municipally owned facility with a design flow of less than 1 MGD (Cities, Towns, Regional Sewer Districts)
	Semi-public	Any facility not municipally, State or Federally owned (i.e. mobile home parks, schools, restaurants, etc.)
	State Owned	A facility owned or managed by a State agency (State parks, prisons, etc.)
	Federally Owned	A facility owned by a federal agency (military owned installation, national park, federal penitentiary, etc.)
Industrial (Wastewater generated in the process of producing a product)	Major	Any point source discharger designated annually by agreement between the commissioner and EPA. Classification of discharger as major involves consideration of factors relating to significance of impact on the environment, such as: nature and quantity of pollutants discharged; character and assimilative capacity of receiving waters; presence of toxic pollutants in discharge; compliance history of discharger.
	Minor	All dischargers which are not designated as major dischargers.
	General	General permit rule provides streamlined NPDES permitting process for certain categories of industrial point source discharges under requirements of the applicable general permit rule, rather than requirements of an individual permit specific to a single discharge. General permit rules: 327 IAC 15-7 Coal mining, coal processing, and reclamation activities; 327 IAC 15-8 Non-contact cooling water; 327 IAC 15-9 Petroleum product terminals; 327 IAC 15-10 Groundwater petroleum remediation systems; 327 IAC 15-11 Hydrostatic testing of commercial pipelines; 327 IAC 15-12 Sand, gravel, dimension stone or crushed stone operations.
	Cooling Water	Water which is used to remove heat from a product or process; the water may or may not come in contact with the product.
	Public Water Supply	Wastewater generated from the process of removing pollutants from ground or surface water for the purpose of producing drinking water.
Pretreatment Urban Wet Weather Group (Associated with NPDES but do not fall under same rule.)	Stormwater-related	Wastewater resulting from precipitation coming in contact with a substance which is dissolved or suspended in the water.
	Industrial Wastewater Pre-treatment	Processed wastewater generated by industries that contribute to the overall wastewater received by the wastewater treatment plant.
	Combined Sewer Overflow (CSO)	Wastewater discharged from combined storm and sanitary sewers due to precipitation events. Municipal and Industrial Urban Wet Weather Programs